Transportation Safety Board of Canada

Bureau de la securite des transports du Canada

Aviation Occurrence Reports

Issue 12

AVIATION OCCURRENCE REPORTS

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Cat. No. TU2-3 / 12E

FOREWORD

AVIATION OCCURRENCE REPORTS

On March 29, 1990, the Transportation Safety Board of Canada (TSB) took over the responsibilities of the Canadian Aviation Safety Board (CASB). The Aviation Occurence Reports contained in this issue were completed by the CASB prior to the changeover. The responsibility for making these reports public now rests with the transportation safety board.

In accordance with the CTAISB Act, part of the Board's objective is to report publicly on its investigations, on the related findings, and on any recommendations designed to eliminate or reduce safety deficiencies.

The Aviation Occurrence Reports publication contains reports on CASB investigations, findings, and recommendations adopted by the Board and occurrence briefs. The sole intent in providing this information is to advance aviation safety. It is not the object of the Board to determine or apportion any blame or liability in connection with aviation occurrences.

This publication contains reports of aviation occurrences, in Canada, involving Canadian or foreign-registered aircraft. Anyone wanting to employ the Aviation Occurrence Reports for purposes other than advancing aviation safety could find the information incomplete.

This publication is also available in French.

A limited number of copies of this publication are retained and are available from:

Transportation Safety Board of Canada
P.O. Box 9120 Alta Vista Terminal
Ottawa, Ontario
K1G 3T8

Cette publication est également disponible en français.

On peut obtenir des exemplaires de la présente publication en nombre limité auprès du:

Bureau de la sécurité des transports du Canada
C.P. 9120 Terminus postal Alta Vista
Ottawa (Ontario)
K1G 3T8

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EXPLANATORY NOTES

TYPES OF REPORTS

The TSB currently produces four types of occurrence reports: there are three investigation report formats and the brief. the most common investigation report format is the summary report which summarizes the details of the investigation in one or two pages. Intermediate reports are somewhat longer and more detailed. For both these types, the complete public report is reproduced in this publication. More factual information is available on summary and intermediate reports and can be obtained by contacting the TSB and referencing the report number. A small number of investigations (generally 15 to 20 per year) result in International Civil Aviation Organization (ICAO) format reports. For the latter type of report, only the synopsis and the conclusions and recommendations sections of the report are included in this publication. The full report can be obtained by contacting the TSB and referencing the report number (which is included with the synopsis). An aviation occurrence brief is a short narrative history of the flight and occurrence. It includes pertinent information based on a report by the pilot or operator of the aircraft. Laboratory reports, if laboratory analysis has been carried out, are available for all three categories of reports and can be obtained in the same manner.

GROUPING OF REPORTS

For ease of reference, the reports in this publication are grouped by broad category of aircraft type and by type of operation within each group. the reports are then presented chronologically (by the date of the occurrence) within each subgroup.

For fixed-wing conventional aircraft, the subgroup is Public Transportation. This includes scheduled, other unit toll, and charter operations. Note that this subgroup is further divided into occurrence involving (i) aircraft of 5 700 kg (12,500 lb) or over and (ii) aircraft under 5 700 kg (12,500 lb). The second subgroup is Commercial Training. This includes licensed flying clubs and commercial specialty training (commercial licence classes 6 and 7, respectively). All other types of fixed-wing aircraft commercial operations are grouped under Other Commercial Operations. The Private Aircraft subgroup includes all privately registered aircraft, both personal and corporate. It is further subdivided according to type of landing gear. The final subgroup contains occurrences involving state-owned aircraft.

For the rotary-wing category, there are fewer aircraft and fewer occurrences. Thus, only three subgroups are used, viz. Commercial, Private, and State.

The final category contains reports and briefs for all other types. This includes amateur-built aircraft, ultralights, gliders, balloons, etc.

CONTENTS OF SUMMARY REPORTS AND INTERMEDIATE REPORTS

Information on Aircraft:

The first block of each report identifies the type of aircraft involved in the occurrence, the model, the registration, the location, and the date of the occurrence; for commercially operated aircraft, the operator is also identified.

Occurrence Report Number:

The second block commences with the occurrence report number (any queries to the TSB should carry this reference). The first two numbers identify the year of the occurrence, the first letter identifies the TSB office that conducted the investigation ('A' - Atlantic, 'Q' - Quebec, 'O' - Ontario, 'C' - Central, 'W' - Western, 'P' - Pacific, 'H' - Head Office). The first number

after the letter identifies the year of the decade of the occurrence. This block also contains information on the type of investigation (a correspondence investigation is one in which the site of the occurrence was not visited by a TSB investigator), the time of the occurrence, the type of operation, the extent of damage to the aircraft, and the type of licence held by the pilot.

Pilot Hours:

This block indicates the total number of hours the pilot had acquired on all types of aircraft, the total number of hours on type, and number of hours flown in the last 90 days (in total and on type).

Injuries:

The injuries sustained by the crew, passengers, or others are classified as Fatal, Serious, or Minor/None (See Definitions).

Summary Report Narrative:

The narrative summarized the history of the flight, pertinent factual information and analysis. The narrative is divided into two parts:

(a) the factual information or a description of what happened, which begins with a description of the history of the flight as close as possible to the occurrence, followed by the pertinent information; and

(b) an analysis of why the occurrence happened.

Reported Circumstances: (Briefs only)

The narrative summarizes the pertinent information based on a report by the pilot or operator of the aircraft.

Findings: (Reports only)

The Board's findings from an investigation are grouped under two subheadings as follows:

Cause-Related Findings: Any element of the occurrence, found during the investigation which, if removed, would have prevented the occurrence, or, if removed, would have avoided or reduced damage to property and people.

Other Findings: Information, discovered during the investigation of an occurrence, which is not cause related but has the potential to enhance or degrade aviation safety.

Safety Action:

For all aviation occurrence investigations, relevant data are recorded to facilitate statistical analysis and the identification of system-wide safety deficiencies through safety studies. In cases where an individual occurrence investigation leads to significant safety action being taken, that action is included in the public report immediately after the findings.

DEFINITIONS

(Extracted from the Canadian Transportation Accident Investigation and Safety Board (CTAISB) Act/Regulations)

"AVIATION OCCURRENCE"

(a) any accident or incident associated with the operation of aircraft, and

(b) any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident as described in paragraph (a).

"ACCIDENT"

"ACCIDENT" means any aviation occurrence where, at any time during the period commencing when the first person boards an aircraft for the purpose of flight and ending when the last person disembarks from the aircraft after the flight,

(a) a person other than a stowaway, sustains a serious injury or fatal injury, that is not self-inflicted or inflicted by another person or caused by natural causes, as a result of that person

  i) being in the aircraft,

  ii) coming in direct contact with any part of the aircraft, including any part that may have become detached from the aircraft, or

  iii) being directly exposed to the jet blast of the aircraft,

(b) the aircraft sustains damage or structural failure adversely affecting the structural strength, performance or flight characteristics of the aircraft and normally requiring major repair or replacement of any affected component part, other than damage or failure that is limited to

  i) the engine, its cowling, or its accessories,

  ii) the propellers, wing tips, antennae, tires, brakes or fairings, or

  iii) small dents or puncture holes in the aircraft skin, or

(c) the aircraft is missing or is completely inaccessible.

"SERIOUS INJURY"

"SERIOUS INJURY" means an injury that is sustained by a person in an accident and that

(a) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was sustained,

(b) results in a fracture of any bone, other than a simple fracture of the nose or of any fingers or toes,

(c) involves lacerations that cause severe haemorrhage or nerve, muscle or tendon damage,

(d) involves injury to any internal organ, or

(e) involves second or third degree burns, or any burns affecting more than five per cent of the body surface.

"INCIDENT"

"INCIDENT" means an aviation occurrence, other than an accident, that affects or could affect the safe operation of an aircraft. Incidents can be reported to the TSB through mandatory or voluntary reporting mechanisms.

According to the CTAISB regulations a "reportable incident" means any incident involving an aircraft with a maximum certified take-off weight greater than 5 700 kg where

(a) an engine fails,

(b) smoke or fire occurs, other than an engine fire that is contained within the engine and does not result in engine failure or damage to other component parts of the aircraft,

(c) difficulties in controlling the aircraft in flight are encountered due to any aircraft system malfunction, weather phenomena, wake turbulence, operations outside the approved flight envelope, or uncontrolled vibrations,

(d) the aircraft fails to remain within the intended landing or take-off area, lands with one or more landing gear retracted, or drags a wing tip or engine pod,

(e) any crew member is unable to perform his flight duties as a result of incapacitation,

(f) decompression, explosive or otherwise, occurs that necessitates an emergency descent,

(g) a fuel shortage occurs that necessitates a diversion or requires approach and landing priority at the destination of the aircraft,

(h) the aircraft is refuelled with the incorrect type of fuel or contaminated fuel that is undetected prior to departure from the ramp,

(i) a collision or risk of collision with any other aircraft or with any vehicle, terrain or obstacle occurs, including a collision or risk of collision that may be related to air traffic control procedures or equipment failures,

(j) a flight crew member declares an emergency or indicates any degree of emergency that requires priority handling by an air traffic control unit or the standing by of a crash, fire fighting or rescue services, or

(k) toxic gases or corrosive materials leak from any cargo aboard the aircraft.

AKLAK AIR LTD.
DE HAVILLAND DHC6 TWIN OTTER C-GDHC
TUKTOYAKTUK, NORTHWEST TERRITORIES
26 MARCH 1990

BRIEF NUMBER: 90-W0082 (Accident)
LOCAL TIME: 1900 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	8,000	3,000
LAST 90 DAYS	80	80

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

The ski-equipped aircraft was landing on a snow-covered lake under flat light conditions. The landing was reported to be uneventful, and reverse power was used to slow the aircraft down to about 30 knots. The nose ski then struck a spit of land that was separating the lake from the sea. The aircraft pitched nose-up, substantially damaging the tail section. It was reported that the aircraft touched down on the last three quarters of the lake.

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PARSONS AIRWAYS NORTHERN LTD.
CESSNA A185F SKYWAGON C-GCIM
GURNEY LAKE, MANITOBA
19 JANUARY 1989

BRIEF NUMBER: 89-C0015 (Accident)
LOCAL TIME: 1240 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	16,000	N/A
LAST 90 DAYS	4	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The aircraft was on a charter flight from Flin Flon, Manitoba to Gurney Lake. On landing, the aircraft touched down hard, and the attachment structure of the left main landing gear failed, allowing the gear to collapse.

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WAWEIG LAKE OUTFITTERS LTD.
CESSNA A185F C-GDTM
THUNDER BAY, ONTARIO 29 mi N
29 JANUARY 1989

BRIEF NUMBER: 89-C0022 (Accident)
LOCAL TIME: 1400 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	4,510	3,800
LAST 90 DAYS	5	5

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

The pilot was 29 miles north of and inbound to Thunder Bay when he encountered deteriorating weather. He elected to carry out a precautionary landing on a nearby frozen lake. During the final portion of the approach, the pilot lost adequate visual cues and encountered a white-out condition. The landing was harder than normal, and both main gear collapsed, causing substantial damage to the propeller, windshield, gearbox, wing struts, and left ski.

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OSNABURGH AIRWAYS LIMITED
CESSNA A185F SKYWAGON C-GIRN
PALANEK LAKE, ONTARIO
07 FEBRUARY 1989

REPORT NUMBER: 89-C0029 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1550 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	11,000	4,000
LAST 90 DAYS	75	20

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	2

SUMMARY REPORT:

A ski-equipped Cessna 185, with the pilot and two passengers on board, crashed at Palaneck Lake while the pilot was conducting a precautionary landing in near white-out conditions. The pilot was seriously injured.

The aircraft departed Webequie, Ontario under visual flight rules (VFR) at 1530 eastern standard time (EST) en route to Summer Beaver, Ontario. This was a continuation of a five-stage round-robin charter flight which originated at Pickle Lake at 1330 EST. Once airborne, the pilot selected a cruising altitude of 2,500 feet above sea level, 1,500 feet above ground level (agl), for the 50-mile flight.

Reported weather conditions for the entire area in which the charter was conducted varied from scattered cloud to broken ceilings based at 2,500 to 3,000 feet agl. Flight visibilities ranged from one to six miles in ice crystals and snow showers.

As the flight progressed toward destination, visibilities began to decrease. Six miles northeast of Summer Beaver, the pilot received a radio transmission from his agent, who told him that the weather there had diminished to less than a quarter mile in blizzard conditions. Strong northeast winds had reduced ground visibilities to near zero.

When the pilot encountered the leading edge of the squall, he decided to land on Palaneck Lake and wait for an improvement in the weather. The pilot reduced the airspeed to 80 miles per hour and selected 20 degrees of flap to set up his approach to land parallel to the north shore of the lake. There was a quartering tail-wind component of at least 20 knots, which caused the aircraft to overfly a planned touchdown point opposite a peninsula which jutted out from the shore. Once this visual cue was lost, the pilot had to determine his height above the lake by referencing the south shore which was one-quarter to one-half mile away. Although the south shore was visible, it was obscured in snow. At this point, the pilot was in a classic whiteout condition. Unsure of his position, and more importantly his height above the lake, the pilot raised the nose of the aircraft slightly and tried to maintain that attitude. Moments later impact occurred.

The aircraft struck the snow-covered frozen lake surface, with a high sink rate and in a left-wing-low attitude. The aircraft momentarily yawed to the right, then pitched forward onto its roof; it came to rest in an inverted attitude, 255 feet from the initial impact point. Vertical impact forces drove the landing gear leg up through the gear box structure, penetrating the lower fuselage in the rudder area of the cockpit.

The pilot suffered multiple fractures to both of his legs; however, he was able to exit the aircraft and direct the passenger who was seated in the rear to assist the passenger in the right front seat to egress the aircraft. The front-seat passenger had been rendered temporarily unconscious and suffered a number of lacerations to the head and face. The pilot, realizing the severity of the situation, pinpointed their exact location on a map. The front-seat passenger, who was the last to leave the aircraft, was also the most familiar with the area. He walked four miles to Summer Beaver for help while the other passenger stayed with the pilot keeping him as warm and comfortable as possible.

The rescue party located the wreckage and picked up the remaining two survivors and returned them to Summer Beaver. Later that night, all three occupants were transported to Thunder Bay.

The owner/operator pilot, who had years of experience and a total of 11,000 flying hours, waited too long to make the decision that he and all pilots who fly in this environment must make – land or turn around. Landing on a lake further east would have prevented this occurrence. Returning to his departure point would also have produced safe results. In this instance, the pilot had been in and out of marginal VFR weather all day. When the weather first started to go down, he assumed that it was another snow shower and that there would be an improvement within the next few miles. When the pilot encountered the whiteout condition, he could not adequately see the landing area, and he misjudged his height above the surface.

CONCLUSIONS:

Findings:
1. The landing was made with a tail-wind component of at least 20 knots which placed the aircraft beyond the planned touchdown point.

2. The aircraft crashed as the pilot was conducting a precautionary landing in whiteout conditions.

3. The pilot suffered multiple compound fractures to both his ankles and legs.

4. The pilot although severly injured was able to coordinate the successful rescue.

Causes:
The pilot misjudged his height above the surface while attempting to land in blizzard-like conditions.

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PROPAIR INC.
DE HAVILLAND DHC-3 OTTER C-FVVY
MACHO RIVER, QUÉBEC
21 FEBRUARY 1989

REPORT NUMBER: 89-Q0047 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1120 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	3,750	1,150
LAST 90 DAYS	30	3

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

SUMMARY REPORT:

The pilot of the ski-equipped aircraft was landing on the frozen surface of the Macho River to unload his cargo. On touchdown, the aircraft bounced twice, and the pilot was unable to maintain directional control. The aircraft, which travelling was at a speed of about 38 knots, struck trees with the right wing and came to rest in the trees on the river bank.

The pilot stated that the weather was fine at the time of the accident and that the aircraft was not exhibiting any mechanical deficiencies. He had completed his annual training the day before the flight.

Prior to the accident landing, the pilot selected an area and carried out a touch-and-go landing to ensure that the surface was not too rough and that no water appeared in the tracks made by the skis of his aircraft. This is the generally accepted procedure for bush pilots. The area was suitable; however, instead of landing back on the original tracks, the pilot decided to land with the intention of stopping the aircraft at the start of the tracks.

The second landing area selected by the pilot was short and narrow. It involved a sharp left turn just after touchdown, and there were bumps scattered about the surface. The pilot encountered several obstacles on the ground, and he could not decelerate as rapidly as he had anticipated. As a result, he had difficulty making the turn.

The pilot said he acted with excessive haste and confidence because he had previously landed in locations which presented greater difficulties.

According to the generally accepted principles for flying ski-equipped aircraft, it is preferable to land in an area that has been verified by the pilot after a touch-and-go landing. The pilot could assume that the second landing area was free of water but could not be certain that the surface was not rough.

CONCLUSIONS:

Findings:
1. The pilot did not land in the area that he had verified.

2. The pilot had difficulty making a sharp left turn shortly after touchdown.

Causes:
The pilot did not select a landing area that was suitable for the manoeuvre he planned to make.

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R & S RUELLING LTD.
CESSNA T207A STATIONAIR 8 C-GGOL
FORT MCMURRAY, ALBERTA
19 APRIL 1989

REPORT NUMBER: 89-W0076 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1135 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	10,000	1,000
LAST 90 DAYS	60	15

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The aircraft was returning to Fort McMurray, Alberta from a visual flight rules (VFR) flight to Fort Chipewyan, Alberta and was approximately six to seven miles northwest of the airport at 3,000 to 3,500 feet above sea level (asl). As the pilot reduced the engine power in preparation for an approach, he heard a loud bang. Shortly afterwards, oil began to appear on the windscreen. Believing that he had sufficient altitude, the pilot continued on a left base approach for runway 07. He heard another bang and the engine started to smoke. At this point, he increased the throttle slightly because he thought that the engine was still producing power and requested that the tower have the fire trucks stand by. As he approached runway 07, the pilot realized he might not reach the airport, and, after passing the airport road, he added 10 degrees of flap. The aircraft touched down in a nose-low attitude, bounced over a road, tearing the nose gear off and came to rest nose-down in the infield area short of runway 07. The propeller was slightly bent, and the skin behind the main gear was wrinkled.

The weather at the time of the occurrence was a scattered layer of clouds at 8,000 feet with a visibility of 15 miles. The wind was from 100 degrees true at two knots.

The aircraft weight and balance was within the prescribed limits. The centre of gravity was forward as the aircraft had no cargo, a reduced fuel load, and almost all the seats had been removed. No mechanical discrepancies were found with the aircraft flight controls that would have affected the controllability of the aircraft.

The aircraft was reported to be serviceable prior to the engine failure. The engine oil quantity, which had been checked prior to the aircraft departing Fort McMurray, was reported to have been at nine U.S. quarts.

A visual examination of the engine (Continental TSIO-520-M) revealed two holes in the top of the crankcase and four detached connecting rods. A small quantity of fresh oil was evident on the fuselage in the form of a streak which extended rearward over the windshield. The equivalent of approximately three and one-half U.S. quarts registered on the oil dip stick when the aircraft was levelled. The engine manufacturer reports the oil pump will cavitate and oil pressure will be lost in flight when the oil quantity is less than five U.S. quarts. A detailed examination of the engine determined that the crankshaft and associated parts displayed evidence of extreme heat distress due to lack of lubrication. No pre-occurrence leaks or discrepancies were found within the engine oil system. Recent oil consumption was reportedly one litre every six hours.

The emergency locator transmitter (ELT) selector switch was found in the OFF position.

It was determined that the connecting rod bearings, caps, and bolts failed due to oil starvation. The engine progressively lost power as four of the six connecting rods became detached during the failure sequence. Although the possibility exists that the aircraft was dispatched with a less than adequate quantity of oil, this could not be determined.

The ELT did not function at impact because the selector switch was in the OFF position.

CONCLUSIONS:

Findings:
1. The engine failed because of a lack of lubrication.

2. The ELT did not function at impact because the selector switch was in the OFF position.

3. The crankshaft and associated parts displayed evidence of extreme heat distress due to lack of lubrication.

Causes:
The engine failed because of a lack of lubrication; the reason for the lack of lubrication could not be determined.

BEAVER AIR SERVICES LTD.
CESSNA U206D STATIONAIR C-GMPZ
BEAR ISLAND, MANITOBA
15 MAY 1989

REPORT NUMBER: 89-C0087 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 0748 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,270	370
LAST 90 DAYS	152	152

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

SUMMARY REPORT:

The aerial reconnaissance patrol was working during a period of extensive forest-fire activity in Northern Manitoba. The patrol had been underway for three hours when the aircraft engine suddenly lost power. The pilot successfully force-landed the aircraft in an open area, incurring only minor damage. The occupants were evacuated from the site by helicopter. The site was in the path of an advancing forest fire, and the airframe was substantially damaged by the fire before it could be removed.

The engine (Continental IO-520-F) had a total of 622.6 hours flown since the last major overhaul, and there were no reported engine discrepancies prior to take-off. Disassembly of the engine revealed that severe heat stress, localized at the number two crankpin position, had occurred. One of the two bolts securing the connecting rod cap to the connecting rod had broken in overload. Plastic deformation caused by heat was evident on the bearing surface of this crankpin. The bushing at this location was destroyed by the heat except for one piece that had welded to the crankpin. The dynamic damper assembly at this location had failed.

The crankpins and journals are pressure lubricated with oil from an internal gallery in the crankshaft. The number one crankpin and the aft crankshaft journal were not damaged. No restrictions or blockages were found in the oil galleries that feed the journals and crankpins. No other mechanical deficiencies or discrepancies were found.

There is a split bushing between the crankpin and the connecting rod. This bushing is installed with an oil lubrication hole matched to the outlet of the internal oil gallery of the crankshaft. A tang which mates into a groove in the connecting rod cap maintains this alignment. It is probable that the bushing shifted out of position, thereby blocking the oil flow and preventing lubrication between the number two crankpin and the crankshaft. Because of the severe heat damage in the area, it could not be determined with certainty why the bushing shifted. A rapid buildup of friction heat due to the loss of lubrication preceded the failure of the connecting rod cap. The rod broke away from the crankshaft and forced a hole in the crankcase.

There were no environmental or human factors causal to this occurrence.

CONCLUSIONS:

Findings:
1. Friction heat due to the loss of lubrication caused the number two connecting rod cap to fail.

2. Other than at the number two crankpin position, no damage to the journals, crankpins, or the crankshaft was found.

Causes:
The number two crankpin bushing likely shifted out of position, thereby blocking the oil flow.

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LAWRENCE BAY AIRWAYS LTD.
CESSNA A185F SKYWAGON C-GYDC
REINDEER LAKE, SASKATCHEWAN
11 JUNE 1989

BRIEF NUMBER: 89-C0097 (Accident)
LOCAL TIME: 1715 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	900	38
LAST 90 DAYS	64	38

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

As he was preparing to depart on a fishing charter, the pilot noticed that the rear of the left float was lower in the water than usual. He judged it to be acceptable and

taxied from the dock in preparation for departure. As he was taxiing, the left float sank lower in the water, and he initiated a right turn to come back to the dock. In the right turn, the float sank even further and the aircraft failed to respond to water rudder input due to the sea state, winds, and the now fully submerged left float. As the float continued to sink, the aircraft tipped to the left and rear. The pilot secured the engine and ordered his passengers to abandon the aircraft. The passengers and pilot were in life-jackets and exited the aircraft which then capsized. They were quickly rescued by a passing boat and were on shore within five minutes. The aircraft remained afloat, but in an inverted position, and was towed to the dock. The float was pumped dry, checked for leaks (none were detected), and the aircraft was refloated. Damage was confined to the right wing tip, top of the vertical stabilizer and water damage to the engine, avionics, and instruments.

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AVIATION PORTNEUF LTÉE
CESSNA A185F C-GVNT
LAKE SEPT-ÎLES, QUÉBEC 19 mi N
12 JUNE 1989

REPORT NUMBER: 89-Q0151 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1754 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	800	250
LAST 90 DAYS	60	60

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	1	2

SUMMARY REPORT

The pilot was returning to his base on Lake Sept-Îles, Québec, with three fishermen on board. The float-equipped aircraft was in cruising flight about 3,200 feet above sea level (asl) when the engine lost power rapidly and stopped. The pilot tried several times to restart the engine but was unsuccessful. The aircraft crashed on the side of a deforested hill. Shortly after, the occupants were rescued by individuals travelling through the woods.

At the time of the accident, the cloud base was at 4,500 feet and the winds were from the northwest at 15 to 25 knots. The pilot was qualified on type and had undergone training two months prior to the accident.

The pilot had partially filled both tanks before departing his base, adding 20 U.S. gallons of fuel in each tank. The aircraft endurance was 2 hours and 15 minutes, and he had used 50 minutes of fuel before the engine failure occurred.

During the flight, the fuel selector lever was in the BOTH position. When the engine stopped, the pilot moved the fuel selector several times, placing it on RIGHT, BOTH, and LEFT. The last position selected was LEFT. While he was switching the fuel selector, the pilot was also attempting to start the engine with the starter.

When the pilot realized that the engine would not start, he attempted to glide to the only lake in the area. He made a 180-degree turn and headed into wind, but the strong winds prevented him from gliding all the way to the lake, and the aircraft crashed on the side of a deforested hill.

At the crash site, it was observed that the left fuel tank was empty, and the right tank contained between 10 and 15 gallons of fuel. The occupants said a large quantity of fuel was leaking under the aircraft, the booster pump was still running, and the fuel selector was on LEFT. It was determined that the fuel had drained from the left tank because the elbow fitting at the booster pump outlet failed on impact and the pump, which was still running, emptied the tank.

The components of the various systems were analysed. Engine performance was within accepted standards. The fuel system between the tank and the engine was checked, and no deficiencies were observed. The electrical switch was checked and was functioning normally.

Although no fuel was found in the left tank, both the evidence and the witnesses' statements point to the conclusion that some fuel was in the tank prior to ground impact. However, an analysis of the various components did not reveal the cause of the engine failure. Following the engine failure, the pilot was unable to reach the only lake in the area for a forced water landing. The aircraft crashed on the side of a deforested hill.

CONCLUSIONS:

Findings:

1. The pilot had a limited number of possible landing areas.

2. The aircraft crashed on the side of a deforested hill.

Causes:
The cause of the engine failure could not be determined.

NORTHWINDS NORTHERN INC.
PIPER PA-31 NAVAJO C-GCJN
LITTLE CHURCHILL FALLS, MANITOBA
17 JUNE 1989

REPORT NUMBER: 89-C0110 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 0700 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,860	350
LAST 90 DAYS	204	85

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	7

SUMMARY REPORT:

The aircraft had settled onto the grass runway and was decelerating when the left main landing gear caught in a rut on the runway and collapsed. The aircraft came to rest with the left wing tip resting on the ground.

The aerodrome is used by the owners of a fishing lodge in northern Manitoba for the purpose of transporting people and supplies into this wilderness setting. It is a 2,000-foot-long, unmarked strip with a gravel/mud surface. Sparse grass sprouts grow along the length of the strip, with long growth in the overrun areas. The runway threshold is unmarked except for the somewhat longer grass. The surface is generally flat in the centre but is rutted on the ends and along the sides.

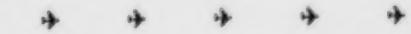
The aircraft landed in a westerly direction with light northerly winds. The tricyle landing gear is hydraulically operated with the nose leg swinging aft into the well and the main legs swinging inboard into the wing. The lower side brace, which is part of the structure that positions the left main landing gear leg, was found fractured. The part had broken in overload. Forces exerted on the left landing gear leg when the wheel was trapped by one of the ruts fractured the lower side brace. The landing gear collapsed when its support structure was lost.

CONCLUSIONS:

Findings:
1. The surface of the runway strip was rutted.

2. The lower strut brace fractured in overload when the wheel caught in a rut.

Causes:
The runway was not well maintained.



AIR MELANCON INC.
CESSNA A185F SKYWAGON C-GUFR
SAINTE-ANNE-DU-LAC, QUÉBEC 6 mi N
05 AUGUST 1989

REPORT NUMBER: 89-Q0224 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1634 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	400	60
LAST 90 DAYS	150	60

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	4	–

SUMMARY REPORT:

The pilot and four passengers were on a pleasure flight in the area of Sainte-Anne-du-Lac, Québec. After successfully completing several low-level passes, the pilot attempted to gain altitude and return to his point of departure, but the floatplane stalled and crashed in the woods. Search and Rescue (SAR) was notified and a search initiated. The occupants of the aircraft were rescued; all had been seriously injured in the accident, and the aircraft was substantially damaged.

The weather was good, and conditions were favourable for this type of flight. No technical deficiencies in the aircraft were found or reported.

The pilot was qualified on type. A few weeks before the accident, he had obtained his qualification certificate after completing the required number of hours. On the day of the accident, the passengers, who were students, said they were looking for some thrills. The pilot made some low-level passes. Witnesses said, however, that the passes were not made below 150 or 200 feet above

ground level (agl). For the benefit of his passengers, the pilot varied his attitude several times with the elevator.

Before returning to base, the pilot decided to gain altitude. He initiated the climb flying close to a mountain. He decreased speed until it was close to the stall speed of 70 knots. The aircraft stalled as the pilot was initiating a left turn, but the pilot did not feel any buffeting before the stall. The stall characteristics of the Cessna 185 indicate that there is no buffeting prior to a stall in this configuration.

Witnesses said that the aircraft entered a right turn before going into a spiral. When the rotating movement was completed, the aircraft made a spiral in the opposite direction. When all rotation stopped, the aircraft struck the trees in an almost level attitude.

On initial impact with the trees, the left wing struck a mature tree and separated from the fuselage. All longitudinal velocity was absorbed on initial impact. The aircraft descended among the trees and the floats slid along the tree trunks. The right wing and the floats absorbed the vertical impact when they struck the ground, and the aircraft came to rest on its right side in very dense bush. The aircraft came to rest on the ground 18 feet from the point of initial impact.

Although the aircraft did not exhibit any obvious signs of an impending stall, the pilot should have maintained sufficient speed for the manoeuvre he intended to execute. As the speed was insufficient, the aircraft stalled, spiralled, and crashed to the ground.

CONCLUSIONS:

Findings:

1. The aircraft exhibited no signs of an impending stall.

2. The pilot said his speed was inadequate when he initiated the climb.

3. The aircraft stalled, spiralled, and crashed to the ground.

Causes:

The pilot did not maintain sufficient speed for the flight.

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AIR SCHEFFERVILLE
DE HAVILLAND DHC-3 C-GLAB
SCHEFFERVILLE, QUÉBEC 32 mi N
06 AUGUST 1989

REPORT NUMBER: 89-Q0223 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1800 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	11,000	3,500
LAST 90 DAYS	110	110

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

After unloading his cargo, the pilot of the float-equipped aircraft took off from a river in a northerly direction and headed for his main base. During the initial climb, the pilot made a right turn over a hilly area. At about 300 feet above ground level (agl), the engine backfired several times. Intending to return to his point of departure, the pilot made a left turn. During the turn, the aircraft struck some tree-tops. The pilot immediately applied full power, but the left wing and float had been damaged when they struck the trees. The pilot managed to set the aircraft down on the river.

At the time of the accident, the ceiling was between 3,000 and 4,000 feet with broken cloud, and visibility was more than 15 miles. Winds were gusting from the east at 10 to 20 miles per hour.

The river used for the take-off is oriented north-south and is bordered on both sides by hills 300 to 400 feet in height. The pilot said that the aircraft encountered a downdraft during the turn, and he initiated his turn too soon.

The cause of the backfires could not be determined, and no other pre-accident discrepancies were revealed. The weight and centre of gravity were within prescribed limits.

After making a right turn immediately after take-off, the pilot was flying at low altitude over hilly terrain when the engine backfired several times. Intending to return to his point of departure, the pilot made a left turn. The aircraft encountered a downdraft on the approach, and there was insufficient altitude for the pilot to clear the tree-tops.

CONCLUSIONS:

Findings:
1. The pilot made a turn shortly after take-off.

2. The aircraft engine backfired several times at low over hilly terrain.

3. Because of the backfires, the pilot was forced to return to his point of departure.

4. The aircraft encountered a downdraft and struck some tree-tops.

Causes:
The pilot initiated a turn immediately following take-off, and the engine may have lost power.

AIR-SASK AVIATION LTD.
PIPER PA-31-350 NAVAJO CHIEFTAIN C-GCTG
WOLLASTON LAKE, SASKATCHEWAN
30 AUGUST 1989

BRIEF NUMBER: 89-C0182 (Accident)
LOCAL TIME: 2200 CST
OPERATION: Commercial
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	13,000	1,500
LAST 90 DAYS	200	200

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

During a straight-in approach to land, the pilot was explaining the pre-landing checks to his passenger. The pilot noticed that the landing lights attached to the nose landing gear were not on, and, because he thought the landing gear was down, he assumed that the bulbs were burnt out. He continued the landing and landed with the landing gear retracted, resulting in substantial damage to the propellers, flaps and belly.

The pilot stated that he forgot to lower the landing gear and that the power setting was too high for the warning horn to activate.

DYMOND LAKE AIR SERVICES
CESSNA 206 STATIONAIR C-GDLO
DYMOND LAKE, MANITOBA
02 SEPTEMBER 1989

BRIEF NUMBER: 89-C0185 (Accident)
LOCAL TIME: 2000 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	4,805	1,822
LAST 90 DAYS	67	39

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The pilot touched down on soft ground short of the runway threshold, shearing off the aircraft nose gear. The aircraft then nosed over.

INUVIK AIR CHARTER LTD.
CESSNA A185F SKYWAGON C-GFVZ
NOEL LAKE, NORTHWEST TERRITORIES
09 OCTOBER 1989

REPORT NUMBER: 89-W0244 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1700 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,030	740
LAST 90 DAYS	200	200

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot of the float-equipped aircraft departed from the float base near Inuvik on a visual flight to Jimmy Lake, Northwest Territories. While the aircraft was in cruise flight at 600 feet above ground level (agl), the engine (Continental IO-520D) suddenly lost power. Attempts to restart the engine were unsuccessful, and

the pilot force-landed on a small lake. The aircraft ran up on the shore and overturned, resulting in substantial damage to the aircraft and minor injuries to the pilot.

It was determined that the flexible hose connecting the vapour separator section of the engine-driven fuel pump to the airframe-mounted fuel accumulator and vapour separator tank was plugged with rubber material. Blockage of this hose would result in an accumulation of vapour which would eventually cause the fuel pump to cavitate and fuel starvation to occur. The rubber material consisted of shaved sections of the inner liner of the hose. This type of damage to the inner liner is caused by the installation of detachable connector fittings without the use of an assembly tool. The assembly tool provides a smooth transition for insertion of the detachable connector into the inner liner of the flexible hose. There was no evidence found in the aircraft logbooks of any entries detailing replacement of this hose. The hose was manufactured in 1976 which was the same year that the aircraft was built.

CONCLUSIONS:

Findings:
1. The engine lost power as a result of fuel starvation.

2. The vapour return hose was blocked with rubber contamination.

Causes:
Blockage of the vapour return hose by rubber contamination resulted in a loss of engine power due to fuel starvation.

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LA RONGE AIR SERVICES
DE HAVILLAND DHC-2 C-GMAQ
GOCHAGEN LAKE, SASKATCHEWAN
28 NOVEMBER 1989

BRIEF NUMBER: 89-C0222 (Accident)
LOCAL TIME: 1310 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	900	195
LAST 90 DAYS	240	150

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

After a twenty-five minute flight, the pilot circled the ski-equipped aircraft over the mining camp at Gochagen Lake to survey the landing area. Rather than land on a longer marked air strip, which was located in the middle of the lake, he elected to land in a confined area towards a shoreline. This area, which was marked by trees, was approximately 3/4 of a mile in length and was positioned directly in front of the tent camp.

On short final, with an indicated airspeed of 80 miles per hour and landing flap selected, the pilot realized that the aircraft was too high for the planned approach. He closed the throttle and dove for the runway. The aircraft passed the planned touchdown point and landed halfway down the strip. Insufficient distance remained to safely overshoot, and without brakes being available, the pilot was unable to prevent the ensuing over-run of the landing area and the subsequent crash into a stand of large trees.

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GOLD BELT AIR TRANSPORT
DE HAVILLAND DHC-3 OTTER C-FCZO
PICKLE LAKE, ONTARIO
12 JANUARY 1990

BRIEF NUMBER: 90-C0007 (Accident)
LOCAL TIME: 0845 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	17,000	4,000
LAST 90 DAYS	135	60

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

Immediately after take-off at Pickle Lake Airport, Ontario, oil appeared on the windshield. The pilot carried out a tight circuit to return to land on runway 27. On final approach, the windshield was completely covered in oil. In order to see the runway for the landing, the pilot opened the left cockpit door window. The pilot was temporarily blinded by the cold and oil, and the aircraft landed heavily damaging the landing gear.

The pilot reported that the engine crankcase breather line froze and pressurized the crankcase, forcing the oil

out the crankshaft oil seal. It was reported that the breather line did not have a hole drilled in it to relieve the pressure in the event the line froze.

BUTLER AIR SERVICE LTD.
CESSNA 172K C-FRTO
CHARLOTTETOWN, PRINCE EDWARD ISLAND
27 JANUARY 1990

BRIEF NUMBER: 90-A0022 (Accident)
LOCAL TIME: 1225 AST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	10,859	3,500
LAST 90 DAYS	291	8

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot departed from Trenton, Nova Scotia, to pick up two passengers in Charlottetown, Prince Edward Island. During the approach to Charlottetown, the wind was gusting from 30 to 35 knots. After landing on runway 28, the pilot taxied onto runway 21. He was proceeding along runway 21 to the terminal when he encountered a strong gust of wind. The right wing lifted and the right wheel came off the ground. The pilot attempted to turn the aircraft into wind, but the wind became stronger and the tail started to lift. The pilot applied power in order to regain control of the aircraft. The aircraft was propelled forward onto the frozen gravel and ice beside the runway, where it turned over on its back. The aircraft was being taxied with the flaps extended.

WALSTEN AIR SERVICE (1986) LTD.
CESSNA 180H SKYWAGON C-FCNL
TRAPLINE LAKE, ONTARIO
17 MARCH 1990

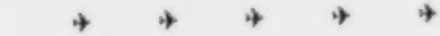
BRIEF NUMBER: 90-C0040 (Accident)
LOCAL TIME: 1100 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	2,175	292
LAST 90 DAYS	61	25

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The pilot executed an approach and landing directly into wind at Trapline Lake. The surface of the lake was covered with numerous snow drifts approximately two to six inches in depth. During the landing, the right landing gear leg fractured at the axle mounting holes. The landing gear leg dug in and folded under the aircraft.



JETWEST BUSINESS CHARTERS LTD.
CESSNA 421C C-FJBS
CHILKO LAKE, BRITISH COLUMBIA
23 MARCH 1990

BRIEF NUMBER: 90-P0099 (Accident)
LOCAL TIME: 1330 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	3,550	375
LAST 90 DAYS	120	30

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	4

REPORTED CIRCUMSTANCES:

The pilot was to transport four passengers and their baggage from Chilko Lake to Vancouver. During the take-off from the sand and gravel airstrip, the pilot was required to use the left edge of the take-off surface to

avoid soft ground in the centre of the runway. The left main wheel ran onto the soft shoulder, and the aircraft veered farther left. The pilot used brake, asymmetric power, and rudder to control the aircraft and was able to manoeuvre back onto the runway. During this manoeuvre, however, he heard a "thump" and decided to reject the take-off. He discovered that the left wing tip, aileron, and left propeller had struck the ground, causing substantial damage to the aircraft.

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BEECHCRAFT G-18S C-FTAE
WATERLOO-GUELPH
REGIONAL AIRPORT, ONTARIO
03 FEBRUARY 1989

BRIEF NUMBER: 89-O/0059 (Accident)
LOCAL TIME: 1159 EST
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Airline Transport Rating

PILOT HOURS:

	PILOT-IN-COMMAND		CO-PILOT	
	ALL TYPES	ON TYPE	ALL TYPES	ON TYPE
TOTAL	7,500	2,500	1,052	16
LAST 90 DAYS	200	20	198	16

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The co-pilot was practising touch-and-go landings on runway 07, with a cross-wind from 330 degrees at 10 to 15 knots. As the aircraft was accelerating to take-off, it began to swing to the left. Before the captain could assume control of the aircraft, it swerved to the left and became airborne. The left wing tip struck the ground, and the aircraft dropped to the ground. The aircraft rolled across a field north of the runway, struck some trees, and came to rest upright.

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PERIMETER AIRLINES LTD.
BEECH D95A TRAVEL AIR C-GQQC
ST. ANDREWS AIRPORT, MANITOBA
04 MARCH 1989

REPORT NUMBER: 89-C0047 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1241 CST
OPERATION: Specialty Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	980	190
LAST 90 DAYS	275	80

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

SUMMARY REPORT:

The instructor and a student were practising a short-field touch-and-go landing on runway 31 at St. Andrews Airport, Manitoba. The landing gear and flaps were selected when the aircraft was on downwind, and the landing briefing was also completed at that time. During the landing roll, while preparing the aircraft for the rolling take-off, the student selected the gear up, and the aircraft settled onto the runway. The aircraft slid off the runway, and the instructor and student exited without injury.

While the aircraft was rolling down the runway, the instructor called for the student to raise the flaps to 10 degrees. The instructor, noticing that the student was very busy just controlling the aircraft, said that he would take care of the flaps. As the instructor was raising the flaps, the student raised the gear. On order from the instructor, the student reselected the gear down, but the gear was already in transit.

The weather was excellent with a 10-knot wind from 330 degrees.

The evidence indicates that the student pilot reacted to the instructor's direction to raise the flaps to 10 degrees by selecting the incorrect handle. The student was very busy with basic aircraft control during the landing roll.

CONCLUSIONS:

Findings:
1. The aircraft landed with the gear down and locked.

2. The landing gear was selected up while the aircraft was still on the runway.

Causes:
The landing gear was raised while the aircraft was still on the runway.

JACKSON AIR SERVICE LTD.
CESSNA TU206G TURBO STATIONAIR C-GGGT
FLIN FLON, MANITOBA
31 MARCH 1989

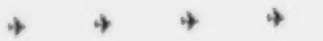
BRIEF NUMBER: 89-C0058 (Accident)
LOCAL TIME: 1500 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	212	7
LAST 90 DAYS	100	7

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The charter flight was also a route check for the pilot, with a company training pilot in the right seat. As the pilot flared to land, the training pilot suggested the nose was too low. The pilot pulled the nose up; however, the aircraft touched down and bounced. Power was added to control the touchdown. When the power was then taken off for the landing, the aircraft stalled, and the aircraft landed hard. The nose landing gear was damaged, and the nose wheel tire was blown.



ATLANTIC AIRWAYS LIMITED
PIPER PA-28-161 WARRIOR C-GQHE
ST. JOHN'S AIRPORT, NEWFOUNDLAND
08 APRIL 1989

BRIEF NUMBER: 89-A0080 (Accident)
LOCAL TIME: 1528 NDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	21	21
LAST 90 DAYS	18	18

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

This was the second solo flight for the student, who had just completed a circuit check with an instructor. The wind was from 140 degrees at 10 knots, and the circuit check was done on runway 16.

The student departed on runway 20, with a cross-wind from the left at 60 degrees and 10 knots. On take-off, the tower controller asked the student if she would be remaining in the circuit. When she replied that she would be, the controller instructed her to make a left turn-out for a circuit on runway 20. On landing, the aircraft bounced and veered to the left. The student lost directional control, and the aircraft departed the runway to the left. The aircraft sustained damage to the propeller, the engine and engine mounts, and the left wing tip.

WEST AIR AVIATION
PIPER PA-44-180 SEMINOLE C-GGPZ
CARP AIRPORT, ONTARIO
09 APRIL 1989

REPORT NUMBER: 89-O/0153 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1330 EDT
OPERATION: Flying training
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:

	PILOT-IN-COMMAND		STUDENT	
	ALL TYPES	ON TYPE	ALL TYPES	ON TYPE
TOTAL	1,010	69	288	27
LAST 90 DAYS	236	24	46	12

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

SUMMARY REPORT:

The aircraft was returning to Carp Airport on a multi-engine simulated instrument flight rules (IFR) training flight. On board were an instructor pilot and a student. A very high frequency omnidirectional range (VOR) Alpha approach procedure was completed, and a right-hand circuit was established for runway 10. There was one slower single-engined aircraft, preceding the Seminole, on final for a touch-and-go landing as well as several other aircraft in the left-hand pattern. As the diminishing distance between the Seminole and the slower aircraft became more critical, some confusion developed in the cockpit regarding a possible overshoot. The pilot did not select the landing gear down before landing, and the aircraft landed on its belly and slid to a stop.

The visual meteorological conditions (VMC) prevailing at the occurrence site were scattered cloud based at 4,000 feet, wind from 060 degrees magnetic at a gusty 5 to 10 knots, and a visibility of 25 miles.

The air crew was qualified for the flight. The student was a licensed commercial pilot who was undergoing training for an IFR rating on multi-engined aircraft.

The aircraft had been maintained in accordance with the manufacturer's maintenance program and with the applicable regulations. The aircraft landing gear system functioned, and no discrepancies were noted. However, the crew stated they did not hear the landing gear warning horn sound. This aural warning is activated by a combination of throttle position, flap position, the landing gear in the retracted position, and the landing gear warning horn circuit-breaker being engaged. If any one of these requirements is removed, the horn will not function. Scuffs and scrapes were visible on the aft exterior of the nose gear doors and outboard side walls of the main tires. These marks and the damage to the underside of the aircraft were consistent with a gear-up landing. A witness stated, in retrospect, after seeing the aircraft on approach, that the landing gear had not been down. The pilot-in-command did not ensure the landing gear was down before landing.

CONCLUSIONS:

Findings:
1. A slower single-engined aircraft preceded the accident aircraft on final.

2. There was some confusion in the cockpit regarding a possible overshoot.

3. The landing gear was not selected down before landing.

Causes:
The pilot-in-command did not ensure the landing gear was down and locked before landing the aircraft.

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WINNIPEG AVIATION CO. LTD.
PIPER PA-28-140 CHEROKEE C-GQPN
ST. ANDREWS, MANITOBA
02 MAY 1989

REPORT NUMBER: 89-C0074 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1545 CDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	72	72
LAST 90 DAYS	30	30

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot departed St. Andrews Airport on an hour-long solo flight. The exercise was to be a combination of

upper air work followed by touch-and-go landings, in preparation for his private pilot flight test.

The first stage of the flight was normal. The pilot returned to the airport from the practice area where he obtained clearance for a straight-in visual approach to runway 18 Right. An approach speed of 60 knots was maintained with full flaps selected prior to touchdown. A series of bounces occurred, with each one more exaggerated than the last. The propeller of the aircraft struck the runway followed by the nose gear which struck with enough force to shear the assembly. The aircraft came to rest nose-down, 500 feet from the initial propeller strike. The pilot, after turning off the electrics, switches, and fuel, deplaned unharmed.

When the aircraft began to porpoise, the pilot used an improper recovery technique. Rather than recover by adding power, he pushed the control column forward, thereby exaggerating an already serious situation.

Post-accident analysis of the nose gear assembly did not reveal any pre-impact mechanical failure.

CONCLUSIONS:

Findings:

1. Improper control input caused the aircraft to strike the runway with sufficient force to shear the nosewheel landing gear.

2. Post-accident analysis of the nose gear assembly did not reveal any pre-impact mechanical failure.

Causes:

The pilot used an improper technique to recover from a bounce landing.

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AIRSPRAY (1967) LTD.
DOUGLAS A26B C-GWLU
RED DEER INDUSTRIAL AIRPORT, ALBERTA
31 MAY 1989

REPORT NUMBER: 89-W0104 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1610 MDT
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:

	PILOT-IN-COMMAND		CO-PILOT	
	ALL TYPES	ON TYPE	ALL TYPES	ON TYPE
TOTAL	7,000	3,000	12,500	150
LAST 90 DAYS	100	80	100	1

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	2

SUMMARY REPORT:

The aircraft was about to depart on a training flight from the Red Deer Industrial Airport. Shortly after the aircraft taxied onto runway 34 to begin the take-off roll, the left main gear collapsed and the left wing struck the runway. The two crew members and the two passengers were uninjured. The aircraft sustained substantial damage.

Good visual meteorological conditions existed at the time of the accident. Both pilots were licensed in accordance with existing regulations.

An inspection of the left main landing gear assembly determined that both the inboard and the outboard trunnion cross-shaft bearing support brackets had fractured. These brackets secure the landing gear trunnion to the nacelle structure. Examination of the components by the CASB Engineering Laboratory revealed that the left inboard bearing bracket failed because of the overload extension of a fatigue pre-crack which had progressed to approximately 30 per cent of the fracture surface. No material or manufacturing deficiencies that would have contributed to the failure were found. The outboard bracket failed because of overload.

The aircraft was part of an A-26 water-bombing fleet. It was equipped with dual controls and was used frequently for training as well as for bombing. The left main landing gear trunnion assembly had been installed following an accident 10 years earlier, and the history of the component previous to that time was unavailable.

The aircraft had completed one training flight of .8 hours duration following the completion of a 100-hour inspection. The relevant inspection sheets indicated that the main landing gear structure had been visually examined for damage and distortion. The pre-crack existed at a location that was not visible without the complete disassembly of the landing gear trunnion assembly.

The aircraft Certificate of Airworthiness (C of A) was issued in the restricted category with a special compulsory condition that only essential crew members be on board during flight. Although it was not company policy to allow passengers to be carried, two employees boarded the aircraft at the last minute for the purpose of A-26 familiarization. The aircraft was not equipped with approved passenger seats, and one passenger was not provided with a seat-belt as required by regulation.

The left inboard trunnion bearing bracket was weakened by fatigue pre-cracking, and it failed under normal loading. The pre-crack was located in an area which was not visible during the recent routine inspection. The left outboard bearing bracket failed in overload because of the additional stress placed on it as the failure on the opposite bracket progressed. The left main gear trunnion became detached from the nacelle structure, and the left main gear collapsed. The use of the aircraft for pilot training subjected the landing gear to a higher-than-normal number of landings per flight hour. This may have contributed to the initiation of a fatigue crack.

CONCLUSIONS:

Findings:

1. The left inboard trunnion bearing bracket failed because of fatigue.

2. The left outboard trunnion bearing bracket failed because of overload.

3. The pre-crack in the left inboard trunnion bearing bracket would not have been visible during a routine inspection.

4. Although the aircraft was operating on a restricted C of A, passengers were carried on the flight.

5. The passengers were not seated in approved passenger seats, and one passenger was not provided with a seat-belt.

Causes:

The inboard trunnion bearing bracket failed under normal loading after being weakened by fatigue cracking.

SAFETY ACTION:

Action taken:

Since the accident, the company, which operates 17 A-26 water bombers, has accomplished a fleet-wide inspection of the main gear trunnion and support assemblies, using the dye penetrant method. The operator has also incorporated a modification (Transport Canada Approval W89-229) to the aircraft which provides additional support between the trunnion cross-shaft and the support brackets.

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MITCHINSON FLYING SERVICE LTD.
CESSNA A185F SKYWAGON C-GYFW
LA RONGE AIRPORT, SASKATCHEWAN
22 JUNE 1989

BRIEF NUMBER: 89-C0117 (Accident)
LOCAL TIME: 0920 CST
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	109	20
LAST 90 DAYS	96	20

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

On touchdown, the aircraft veered to the right, and the left wing came up. The pilot attempted to correct with the use of ailerons, but the aircraft departed the right side of the runway and ground looped on the grass. The wind was light at the time of the occurrence.

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COLLISION BETWEEN:
CESSNA 172N C-GXMJ and
CESSNA 172N C-GWEG
RED DEER INDUSTRIAL AIRPORT, ALBERTA
14 JULY 1989

REPORT NUMBER: 89-W0150 (Accident)
LOCAL TIME: 0848 MDT
INFORMATION SOURCE: Field Investigation

CESSNA 172N C-GXMJ

OPERATOR: Sky Wings Aviation Academy Ltd.
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	23	11
LAST 90 DAYS	11	11

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

CESSNA 172N C-GWEG

OPERATOR: Sky Wings Aviation Academy Ltd.
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	320	295
LAST 90 DAYS	120	95

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

SUMMARY REPORT:

The student pilot flying the Cessna 172, C-GXMJ, had just completed several dual touch-and-go landings for a pre-solo check-out. She had cleared the runway onto a taxiway to let her instructor out of the aircraft and was starting to taxi back to the runway for solo circuits. Meanwhile, a second Cessna 172, C-GWEG, had landed from a similar exercise, and the student pilot was turning onto the taxiway to drop off his instructor. He saw the first Cessna 172 taxiing toward him and stopped, knowing there was insufficient room on the 50-foot taxiway for the two aircraft to pass each other safely. The instructor saw that C-GXMJ had moved to the right side of the taxiway but was not slowing down. He applied power in an attempt to turn off the taxiway onto the grass and shouted at his student to get his feet off the brakes so that he could get his aircraft moving. The aircraft had only moved a few feet before the two aircraft collided. The left wing of C-GXMJ scraped under the left wing of C-GWEG, the two wings overlapping by four feet, and, as the student pilot had not throttled back, her aircraft, C-GXMJ, veered to the left through 90 degrees, and her propeller contacted the tailplane of the other aircraft. The student pilot flying C-GXMJ did not realize that the taxiway was only 50 feet wide and that two Cessna 172s could not safely pass on the taxiway.

The portion of the taxiway used by the school to drop off instructors following pre-solo checks is adjacent to a run-up area. This area is used by pilots on the taxiway to give way to aircraft clearing the runway. The Cessna 172 has a 36-foot wing span, and the distance from the right main wheel to the left wing tip is 23 feet. Two aircraft, both with their right wheels on the edge of the taxiway, could pass with four feet between their wing tips.

The student pilot's limited experience had not prepared her to meet another aircraft on a narrow taxiway. The option to turn into the run-up area was available to her, but the possibility that it would be difficult to pass the other aircraft did not occur to her.

CONCLUSIONS:

Findings:
1. The 50-foot taxiway was not wide enough for two Cessna 172s to pass each other safely.

2. It was the normal practice at the school for an aircraft on the taxiway to give way to an aircraft entering the taxiway from the runway, by moving into the run-up area.

3. The student pilot taxiing out was not aware that two aircraft could not pass safely on the taxiway.

4. The instructor on the dual aircraft attempted to turn off the taxiway to avoid the collision.

Causes:
The student pilot of a Cessna 172 attempted to taxi by another Cessna 172 on a narrow taxiway on which there was insufficient space for the aircraft to pass. Lack of experience was a contributing factor.

PIPER PA-28-161 WARRIOR 2 C-GRKN
BANFF, ALBERTA 10 mi W
19 JULY 1989

REPORT NUMBER: 89-W0157 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2105 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,500	150
LAST 90 DAYS	20	3

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	–

SUMMARY REPORT:

Following a half-hour check flight with the aircraft operator, the pilot departed the Okotoks Air Park for a sightseeing trip into the Rocky Mountains. About three hours later, the aircraft crashed on the north wall of a blind canyon. The aircraft was located during the night by Edmonton Search and Rescue, using information from the Search and Rescue Satellite (SARSAT) program, and the pilot was rescued at dawn.

The pilot sustained severe head injuries in the crash and cannot recall the events leading up to the accident. He was therefore unable to assist in determining the cause.

The pilot was not familiar with the area, and, although he had flown over the mountain ranges of the eastern United States, he had no mountain flying experience in the Rocky Mountains or similar areas.

The aircraft was found on the 35-degree sloped side of a canyon, 7,200 feet above sea level, headed towards the 9,000-foot-high closed end of the blind canyon, less than two miles away. At this elevation, the canyon is less than 2,500 feet wide. The aircraft struck a tree while in a 40-degree left bank attitude with 12 degrees of nose-up pitch. It descended at an angle of 20 degrees, struck the ground, and travelled a further 50 feet before coming to rest.

A post-crash inspection of the aircraft, including a full engine run-up, did not reveal any deficiencies that could have contributed to the occurrence. Both fuel tanks had been split open during the impact and their contents were lost. The aircraft had departed Okotokos with over five hours of fuel on board. The aircraft's hour meter showed that the aircraft had only flown three hours and five minutes, therefore fuel exhaustion was ruled out.

The aircraft was equipped with a Narco 10 emergency locator transmitter (ELT). The ELT activated upon impact, aiding the search and rescue aircraft.

The weather during the period of the flight was ideal with clear skies and light and variable winds. Other pilots who had been flying in the area at the time reported clear weather with no wind or turbulence.

The pilot, who was not familiar with the area, inadvertently flew up a blind canyon. He lost control of the aircraft in an attempt to climb out of or turn within the confines of the canyon.

CONCLUSIONS:

Findings:
1. The pilot sustained severe head injuries in the accident and had no memory of the events leading up to the event.

2. The Narco 10 ELT activated upon impact and aided rescue aircraft in locating the downed aircraft.

Causes:
The pilot was not familiar with the area and inadvertently flew into a blind canyon.

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WINNIPEG FLYING CLUB
CESSNA 152 C-GKTJ
ST. ANDREWS AIRPORT, MANITOBA
11 AUGUST 1989

REPORT NUMBER: 89-C0163 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1533 CDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	40	40
LAST 90 DAYS	40	40

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The student pilot had just completed a solo cross-country visual flight which originated and terminated at St. Andrews, Manitoba. On arrival back at St. Andrews, the

pilot decided to practise touch-and-go landings using the short-field landing technique which had been demonstrated to him by his instructor earlier that day. The aircraft was cleared for a straight-in approach to land on runway 13. Following what witnesses described as a normal landing, the aircraft veered off the right side of the runway, about 1,100 feet from the threshold. It continued over a grass-covered infield and entered a drainage ditch. The nose gear failed and the aircraft came to rest in an inverted position, one foot away from taxiway Hotel. The uninjured pilot was able to exit the aircraft unassisted.

Runway 13/31 at St. Andrews is asphalt covered and is 3,000 feet long by 75 feet wide. There were no reported runway unserviceabilities. Since the flight was conducted under visual flight conditions, aids to navigation were not a factor in the occurrence. Reported winds at the time of the occurrence were from 150 degrees at five knots. Skies were clear and the temperature was 24 degrees Celsius.

There were no reported aircraft engine or flight control malfunctions prior to the occurrence. Post-accident wreckage analysis did not reveal any aircraft abnormalities. The brake assembly was found to be functioning normally after the occurrence. Records indicate that the aircraft was maintained in accordance with approved maintenance schedules. The aircraft was under its gross weight and within the centre of gravity limitations.

This student pilot was a participant in the Canadian Armed Forces Air Cadet program; he was one of the 17 candidates selected from Western Canada to take part in a seven-week Private Pilot course. The pilot had a total of 40 hours, all of which were on the aircraft type involved in the accident.

The pilot indicated that a cross-wind was a contributory factor in this occurrence. Actual wind reports and witness statements indicate that the wind was light although a slight cross-wind existed.

The pilot further stated that he was planning a short-field landing. Evidence showed that the aircraft actually touched down 900 feet from the threshold, travelled 200 feet, and then departed the runway and continued another 950 feet before coming to rest in an inverted position.

Ground speed across the infield was fast enough to cause extensive nose gear and propeller damage when the aircraft entered a drainage area short of taxiway Hotel. There was no evidence that the brakes were used to slow the aircraft down. Power bends in the propeller also indicate that the throttle was partially open after the aircraft left the runway.

Improper technique by the pilot resulted in a loss of directional control. Post-accident evidence indicates that, once the aircraft veered off the runway, the pilot did not take adequate corrective action to stop the aircraft.

CONCLUSIONS:

Findings:

1. There was a light cross-wind at the time of landing.

2. The brake assemblies were serviceable following the accident.

3. The pilot was unable to maintain directional control of the aircraft after landing.

4. The aircraft became inverted on the side of the runway after the nose gear collapsed.

Causes:

Improper landing technique by the pilot resulted in a loss of directional control.

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PIPER PA-28-140 CHEROKEE CRUISER C-GBYE
ST. HUBERT AIRPORT, QUÉBEC
16 AUGUST 1989

BRIEF NUMBER: 89-Q0238 (Accident)
LOCAL TIME: 1230 EDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student Pilot

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	52	52
LAST 90 DAYS	52	52

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The student pilot was practising touch-and-go landings. After completing two circuits, the airport controller advised the pilot to make a full stop due to approaching rain showers and associated strong winds.

The aircraft was on short final with full flaps selected, at a speed of 70 knots when it dropped suddenly. The pilot added full power, but the main gear touched down hard, and the aircraft bounced on the nose gear. The aircraft

bounced three times before coming to a stop. On the third bounce, the nose gear was damaged, and the nosewheel separated.

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CESSNA 150M C-GCNY
GLENBUSH, SASKATCHEWAN 1 mi S
19 SEPTEMBER 1989

BRIEF NUMBER: 89-C0191 (Accident)
LOCAL TIME: 1600 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	300	62
LAST 90 DAYS	90	14

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

While attempting to land at a private airstrip, the pilot mistook the taxiway for the runway. Just prior to touchdown, a cross-wind caused the aircraft to drift to the right of the taxiway and over a soft, ploughed field. The pilot attempted an overshoot, but the aircraft was unable to clear hydro lines at the end of the taxiway. The aircraft went through the hydro lines and crashed, coming to rest in an inverted position.

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NELSON AIR SERVICE LTD.
PIPER PA-18-180 SUPER CUB C-GKLT
STRATHMORE, ALBERTA 1/2 mi S
25 OCTOBER 1989

REPORT NUMBER: 89-W0255 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1145 MDT
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	3,500	1,500
LAST 90 DAYS	249	96

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

SUMMARY REPORT:

The instructor, accompanied by a student pilot, prepared for the first lesson in a float endorsement. After a demonstration in taxiing, the instructor began a take-off from the north end of a small lake with the student following through on the controls. The aircraft got up on the step at 45 to 50 mph and was rocked out of the water, but did not seem to be accelerating normally. The instructor reduced power and, when he looked ahead as the aircraft settled back onto the water, he saw that the aircraft was going to strike the three-foot-high shoreline. He applied full power and asked the student to apply flap. The aircraft became airborne and cleared the shore, but then settled onto the grass surface and skidded for 50 feet before slowly nosing over.

The operator's maintenance organization examined the aircraft and engine (Lycoming 0-360A1A) but was unable to determine the cause of the power loss. An engine teardown did not reveal any mechanical cause for the loss of power.

CONCLUSIONS:

Findings:
1. During take-off, the aircraft did not accelerate normally.

Causes:
The engine lost power during take-off for undetermined reasons.

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AÉROCLUB DE SAINT-MATHIEU-DE-BELOEIL INC.
CESSNA 150 C-GAJP
SAINT-MATHIEU-DE-BELOEIL, QUÉBEC
11 DECEMBER 1989

BRIEF NUMBER: 89-Q0333 (Accident)
LOCAL TIME: 1745 EST
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	115	115
LAST 90 DAYS	14	14

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was completing a full stop landing following a one-hour night training flight. During the landing roll, the aircraft's left wheel contacted ice and snow bordering the left edge of the runway. The aircraft suddenly swerved to the left, hit a snowbank and overturned. The pilot was not injured.

The weather conditions at the airport at the time of the occurrence were not a factor. The wind was calm. The initial touchdown had been made left of the runway centre line. The pilot stated that several runway lights marking the left border of the runway were burnt out and had they been functioning properly, they could have indicated more clearly the extent to which the aircraft was drifting towards the edge of the runway. The lack of injury was attributed to the wearing of seat-belts and shoulder harnesses.

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CESSNA C-152 C-GYHN
SAINT-ANDRÉ AVELLIN, QUÉBEC
19 JANUARY 1990

BRIEF NUMBER: 90-Q0032 (Accident)
LOCAL TIME: 1444 EST
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	31	31
LAST 90 DAYS	3	3

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was conducting circuits solo, but under supervision. During the landing roll, the aircraft contacted a patch of ice and snow. The aircraft slid off the side of the runway and came to rest in deep snow. The pilot was not injured.

The wind was calm and the weather was suitable for the flight. The surface of the 3600 foot asphalt runway was covered with icy patches. The pilot believed that the condition of the runway was acceptable as several aircraft were using the runway without any apparent problem. The lack of injury was attributed to the low speed of the aircraft and the fact that the pilot wore a seatbelt and shoulder harness.

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OKOTOKS FLIGHT CENTRE INC.
CESSNA 152 C-GXQC
OKOTOKS AIR PARK, ALBERTA
06 FEBRUARY 1990

BRIEF NUMBER: 90-W0039 (Accident)
LOCAL TIME: 1345 MST
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	63	47
LAST 90 DAYS	26	26

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The student pilot was returning from the practice area and decided to make one touch-and-go landing. He had seen a light twin land on runway 34, and after checking the wind, he elected to do the same. The student pilot reported that the wind at the time of the occurrence was approximately 230 degrees to 250 degrees magnetic at 10 to 15 knots. After touching down, while the pilot was setting the controls for take off, the aircraft veered toward the left side of the runway. He countered with right rudder, and the aircraft began sliding. He relaxed the controls, and the sliding stopped; but the aircraft continued to the left and off the runway. The nosewheel collapsed when the aircraft left the runway, and the aircraft nosed over. The wings, horizontal stabilizer, and propeller were damaged. The student pilot, sole occupant of the aircraft, was uninjured.

The runway surface condition at the time of the occurrence was 50 percent gravel and 50 percent packed snow and ice.

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MORGAN AIR SERVICES CO. LTD.
PIPER PA30B TWIN COMANCHE C-FCCM
CALGARY INTERNATIONAL AIRPORT, ALBERTA
14 FEBRUARY 1990

BRIEF NUMBER: 90-W0046 (Accident)
LOCAL TIME: 1150 MST
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	3,400	220
LAST 90 DAYS	180	90

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

While carrying out a simulated single engine instrument landing system (ILS) approach to runway 28, the student pilot lowered the landing gear handle upon intercepting the glideslope. The instructor noted that the pilot had selected the gear handle down, but neither noticed the absence of the green "gear down" light, nor did they hear the gear warning horn. A smooth wheels-up landing was made on the runway centre line. A post landing check made by the instructor, revealed that the circuit breaker for the landing gear motor had popped. The company was unable to determine why the circuit breaker had popped.

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WHITE'S AIRCRAFT SERVICES LTD.
CESSNA 152 C-GZKT
LABELLE LAKE, QUÉBEC
20 FEBRUARY 1990

BRIEF NUMBER: 90-Q0058 (Accident)
LOCAL TIME: 1300 EST
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Private (Tourist)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	230	90
LAST 90 DAYS	90	80

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was on a solo training flight, preparing for his commercial licence. During the climb-out following a simulated engine failure over Labelle lake, the pilot saw, at the last minute, cables crossing his intended flight path. He immediately reduced his angle of climb, and the aircraft struck the lowest cable. After checking the aircraft, the pilot returned to St-André-Avellin airport, Québec and landed without further incident.

The sky was clear, the visibility was over 20 miles and the wind was blowing from 310 degrees at 10 knots. During his training, the pilot had overflown Labelle lake several times, but he had never noticed the cables. The pilot stated that he would have been able to avoid the cables joining the two mountain tops at a height of about 200 feet above ground level, if they had been properly marked.

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OTTAWA FLYING CLUB
CESSNA 150M C-GYCE
OTTAWA INTERNATIONAL AIRPORT, ONTARIO
28 FEBRUARY 1990

BRIEF NUMBER: 90-O/0103 (Accident)
LOCAL TIME: 0945 EST
OPERATION: Specialty Training
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	10,000	8,000
LAST 90 DAYS	100	60

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

During a flight test, the student pilot and examiner were taxiing eastbound on Sierra taxiway when the examiner noticed a snow plow backing up onto the taxiway. It appeared that the driver had not seen the aircraft. The examiner told the student to stop. The snow plow continued to back up, struck the leading edge of the left wing, and swung the aircraft around approximately 45 degrees.

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INTERLAKE AVIATION CO. LTD.
CESSNA 150 C-GYEY
ARBORG, MANITOBA 4 mi W
02 MARCH 1990

BRIEF NUMBER: 90-C0034 (Accident)
LOCAL TIME: 1445 CST
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	140	140
LAST 90 DAYS	76	76

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

After completing a successful precautionary landing at the Arborg airport, the pilot returned to his touchdown point on runway 35 to perform a soft-field take-off. The winds, as reported by the pilot, were gusting from the north-west. Immediately after applying full power, the aircraft was blown to the right, and the right main wheel became caught in a snow drift. The pilot reduced the power to idle, and rejected the take-off. The aircraft tipped over, and came to rest on its nose and right wing; the propeller, right-hand wing tip and engine crankcase were damaged.

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MEADOWS AERO LEASE LTD/ETAL
FLEET 80 C-FDPN
LANGLEY, BRITISH COLUMBIA
03 JANUARY 1989

REPORT NUMBER: 89-P0006 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: Between 0200-0400 PST
OPERATION: Private Other
DAMAGE: Destroyed
PILOT LICENCE: None

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	N/A	N/A
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	1	–	–

HISTORY OF THE FLIGHT:

The aircraft was taken from its regular shelter without the knowledge or consent of the owner. An aircraft, believed to be the accident aircraft, was observed between 0130 and 0210 Pacific standard time (PST) on 03 January 1989, circling low above a lumber mill near the accident site. At the time, it was being banked steeply, and the engine was revving up and down. On the morning of 04 January 1989, the wreckage was found 10 kilometres east-southeast of the Pitt Meadows airport. The aircraft had crashed and burned in a stand of tall trees. There were no survivors, and the aircraft was destroyed.

PERTINENT INFORMATION:

The aircraft was on a magnetic heading of 155 degrees, in a left bank attitude when it struck the tops of trees about 33 metres above the ground. The strut below the left wing was severed, and the aircraft then plunged through the trees at an angle of 30 degrees and struck the ground 42 metres further on. The aircraft came to rest on its left side, after making a six-foot-long and two-

foot-deep gouge in the ground. A post-crash fire then destroyed most of the aircraft.

The dual-controlled aircraft was serviceable, its weight and centre of gravity were within the prescribed limits, and the post-crash examination, to the degree possible, did not disclose any failure or malfunction. The propeller damage indicated that the carburettor-type engine was developing power at the time of the occurrence. The aircraft was not equipped with an emergency locator transmitter (ELT), nor for instrument flight.

The aircraft was last flown on 31 December 1988 and was left parked, unlocked, with about 13 gallons of fuel on board, enough for about 2 1/2 hours of flying. It was last seen on airport property between 1900 and 2000 PST, on 02 January 1989, and was reported stolen around 1800 PST on 03 January 1989. The investigation could not establish how long the aircraft had been airborne during this flight.

The hours of operation for the Pitt Meadows Airport Control Tower are between 0700 and 2300 PST. When the tower is closed, the runway lighting can be activated for 15 minutes by keying the transmitter of an aircraft radio (ARCAL). It could not be determined if the runway lighting had been used during the night.

The weather around Pitt Meadows and the occurrence site at the probable time of the accident was below visual flight rules (VFR) limits. It was dark, the ceiling was between 300 and 800 feet, and the visibility ranged between one and five miles in rain and fog. The surface temperature ranged from zero to four degrees Celsius, and the temperature/dew point spread was between zero to two degrees Celsius. According to the carburettor icing probability chart, serious carburettor icing could occur under these atmospheric conditions.

The occurrence site was in a stand of tall trees, 300 feet above sea level. The area is sparsely populated, with very few lights to serve as visual reference for flight at night.

The person believed to have been at the controls of the aircraft was found in the left front seat. He was not a licensed pilot, but, according to his father, he had trained for a pilot's licence and was within two flying hours of taking a flight check for his licence when he was diagnosed medically unfit. There is, however, no record to verify how much flying training he had received. He had made application for a pilot licence in 1980, at which time he was assessed medically fit Category 3. In a 1981 medical examination, he was diagnosed as having idiopathic epilepsy, and, in 1982, he was prescribed Phenobarb and Dilantin medication to control this condition. It was reported that, subsequent to this diagnosis, the pilot became involved with alcohol and drugs and that he experienced bouts of depression. The other person on board the aircraft had no known aviation experience.

The police investigation uncovered that the two occupants of the aircraft were seen drinking together in a bar until about midnight on 02 January 1989. The post mortem examination established a blood-ethanol level of 182 milligrams per cent (mg.%) for the pilot and 222 mg.% for his companion. These levels are more than twice the legal limit for driving a motor vehicle. The presence of Phenobarb and Dilatin in the blood of the person presumed to have been at the controls of the aircraft confirmed that he was taking anti-epileptic medications. However, it could not be established if an epileptic seizure was a factor in this occurrence.

Alcohol (Ethanol) is a depressant drug which negatively affects judgement, reaction time, and motor skill performance over a period of time. Phenobarbital is a presciption drug used as a sedative, and Diphenylhydantoin (Dilantin) is used as an anticonvulsant in grand mal epilepsy. Alcohol and Phenobarb, taken in combination, are likely to exaggerate the drowsiness effect of the phenobarb, resulting in an impairment in judgement, alertness, response time, and decision-making abilities. It can also cause alcoholic nystagmus (involuntary rapid movement of the eyeball), which could lead to disorientation.

ANALYSIS:

The low ceilings, fog, and restricted visibility at night in an area where few ground lights were present would make controlled flight by visual references alone very difficult. The unlicensed pilot, whose judgement and abilities would have been seriously affected by alcohol, was seen, in apparent difficulty, circling at low level the well-lighted yard of a lumber mill. However, as the aircraft approached the sparsely lighted accident area, it is likely that he lost visual reference with the ground at low level and either lost control of the aircraft or inadvertently flew into the trees.

CONCLUSIONS:

Findings:

1. The aircraft was taken without the owner's consent.

2. Neither occupant of the aircraft was a licensed pilot.

3. The blood-ethanol level found in the tissues of the persons in the left and right seat was 182 mg.% and 222 mg.% respectively.

4. The person believed to have been at the controls of the aircraft was diagnosed as having idiopathic epilepsy.

5. The weather in the vicinity of the Pitt Meadows airport and the occurrence site was below VFR limits.

6. The weather conditions were conducive to carburettor icing.

7. The aircraft collided with trees for undetermined reasons.

Causes:
The Canadian Aviation Safety Board determined that the pilot did not have the training and experience to operate the aircraft in the conditions present at the time of the occurrence, and his judgment and abilities were significantly impaired by a high blood-alcohol level.

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JET WEST BUSINESS CHARTERS LTD.
CESSNA 421C C-GJLN
TOFINO AIRPORT, BRITISH COLUMBIA
03 FEBRUARY 1989

REPORT NUMBER: 89-P0025 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 0810 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:

	PILOT-IN-COMMAND		CO-PILOT	
	ALL TYPES	ON TYPE	ALL TYPES	ON TYPE
TOTAL	2,050	50	1,200	200
LAST 90 DAYS	110	50	91	8

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

SUMMARY REPORT:

The aircraft flew from Vancouver, British Columbia to Tofino, British Columbia where five passengers disembarked. For the next flight, the pilot taxied on runway 25, planning to take off from runway 07. When the aircraft was 50 feet from the end of the runway, travelling at about 10 mph, the pilot commenced a 180-degree turn to the right to line up with the runway. Before the turn was completed, the aircraft began to head toward the north edge of the runway. Both pilots applied heavy brake pressure and shut down the engines in an effort to stop; however, the aircraft ran off the runway into a ditch and was substantially damaged. There were no injuries.

It had rained in Tofino three days before the accident, and then the temperature dropped and remained below freezing. At the time of the occurrence, the wind was blowing from 050 degrees magnetic at 12 knots gusting to 25 and the temperature was minus eight degrees Celsius.

The pilot reported that the brakes had operated normally when he landed at Tofino and before he taxied onto the runway for departure. He stated that he did not have to use the brakes after leaving the terminal area and while taxiing over 3,000 feet to the end of the runway. It was not until he attempted to slow down for the turn 50-feet from the end of the runway that the brakes became ineffective. The aircraft's brakes were examined after the accident, and they operated normally. There were no skid marks observed on the runway after the occurrence. It is possible that there were black ice patches on the runway, although none was observed by either the pilots or the recovery team.

The strong gusting tail wind would have increased the taxi speed and thus would have required more than normal braking action to stop the aircraft. In addition, turning into the strong tail wind would have tended to increase the aircraft's rate of turn. When the aircraft reached the end of the runway, considerable braking action would have been required to slow down and control the turn. Since the brakes were operating normally before and after the accident and there was no evidence of a brake failure, it is likely that the pilot was taxiing faster than intended because of the strong tail wind and lost control during the turn when the wind increased the turn rate of the aircraft.

CONCLUSIONS:

Findings:
1. There was a strong gusting tail wind while the aircraft was taxiing.

2. The pilots applied heavy braking but were unable to stop the aircraft on the runway.

3. The brakes operated normally both before and after the occurrence.

Causes:
It is probable that the pilot was taxiing too fast for the conditions and lost control of the aircraft during the turn.

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LITTLE RED AIR SERVICES LTD.
PIPER PA-31-350 CHIEFTAIN C-GOMH
FORT VERMILION AIRPORT, ALBERTA 3/4 mi E
10 FEBRUARY 1989

REPORT NUMBER: 89-WOO32 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2318 MST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	16,500	1,400
LAST 90 DAYS	270	140

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	2

HISTORY OF THE FLIGHT:

The MEDEVAC flight was being conducted at night in accordance with visual flight rules (VFR). The pilot, with a paramedic and nurse on board, departed runway 07 at Fort Vermilion and was proceeding to Jean d'Or Prairie to pick up the patient. During the post-take-off phase of flight, the aircraft struck trees about 2,800 feet from the departure end of the runway and subsequently descended to the ground approximately 1,000 feet beyond the first contact with the trees. The pilot was seriously injured.

PERTINENT INFORMATION:

The aircraft struck the trees while in a level attitude at approximately 35 feet above the ground (agl) and cut a swath for about 400 feet. The propellers, leading edges of the wings and horizontal stabilizer sustained substantial damage before the aircraft climbed above the trees for about 300 feet, then descended through the tree-tops into a snow-covered field. The aircraft struck the ground heavily and swung through 180 degrees before coming to a stop.

The weather was high thin scattered cloud with good visibility and calm wind. A night departure from runway 07 is toward a dark sparsely settled area where there are few, if any, lights on the ground, or other distinguishable ground features, to provide visual reference.

The pilot had a valid licence, a Class 1 Instrument Rating, and was experienced on the aircraft type. The pilot reported that, on the take-off roll, the aircraft normally lifts off without applying back pressure on the control wheel. On this take-off, he had to apply back pressure to achieve lift-off and continued to hold back pressure as he retracted the landing gear and flaps and reduced the engine power to climb settings. The pilot does not recall retrimming the aircraft for the climb after take-off.

For take-off, the pilot used 15 degrees of flaps, rotated at 101 mph, retracted the landing gear and flaps, reduced the engine power to climb settings and accelerated to the "blue line" (single engine best rate of climb speed of 125 mph). The Piper Pilot's Operating Manual specifies a rotation speed of 90 mph with 15 degrees of flap for a short-field take-off and 101 mph with the flaps up for a normal take-off. The manual further recommends that once clear of all obstacles retract the landing gear and flaps, select engine climb power, and accelerate to the recommended climb speed.

The pilot reported that, after take-off, he made the transition from visual reference to instruments for the climb. He believed that he had established a positive rate of climb, and, moments after take-off, he recalls that the needle on the airspeed indicator appeared to jump about 15 mph above the "blue line." At the same time, he noted that the altimeter indicated approximately 850 feet above sea level (asl) (field elevation 836 feet asl). He immediately pulled back on the control wheel to climb, and the aircraft struck the trees. The pilot's scan of the instruments was incomplete during the transition to instruments as evidenced by his belief that he had attained an altitude of about 200 feet agl; however, he was unable to recall any indications on the flight instruments that would have indicated the aircraft was climbing.

The paramedic, who was experienced in the conduct of MEDEVAC flights, was seated in an aft facing seat behind the pilot. He reported that he could see the ground from the time the aircraft departed the runway until the crash and estimated that the height attained was between 20 and 25 feet agl. He recalled that, on a previous night flight with the same pilot using the same runway, the pilot's departure profile was very flat and close to the trees.

Prior to take-off, the pilot followed his normal procedure of setting the elevator trim with reference to the trim position indicator located on the centre pedestal. It was the pilot's practice to use the manual trim wheel to set the trim, rather than the electric thumb switch on the control wheel.

The elevator trim system was examined for evidence of pre-impact mechanical defects. No defects were found that would have prevented normal operation of the trim system. The travel limits of the elevator trim tab were found to be within the manufacturer's specifications. Aircraft damage precluded the application of electrical power to obtain a cockpit indication of the trim position.

It was reported that the trim position indicator would occasionally stick and give erroneous indications of the actual trim position.

The aircraft elevator trim wheel was set three and one-quarter turns from full nose-down, toward the nose-up position, when documented at the site. This setting was applied to two other PA-31-350 aircraft. It was found that the trim wheel setting was consistent with the trim tab position on all three aircraft; however, the trim position indicator in the cockpit registered in the nose-down portion of the marked take-off range.

Discussions with three other PA-31 pilots revealed that they did not rely on the trim position indicator to give an accurate indication of trim position. To set the trim, they rotated the trim wheel full nose-down then back toward nose-up between four and six turns depending on the load distribution.

ANALYSIS:

The pilot's take-off procedure contributed to the occurrence because he did not ensure that he had established and maintained a positive rate of climb and was clear of all obstacles before retracting the landing gear and flaps, setting engine climb power, and accelerating to the recommended climb speed. The pilot expected the aircraft to be climbing because he had achieved the "blue line"; however, since the aircraft was not trimmed for the climb, a positive rate of climb was never established.

It was not determined why the pilot did not retrim the aircraft for the climb, nor was it determined precisely what the elevator trim cockpit indications were at take-off. However, the take-off characteristics of the aircraft were consistent for an aircraft that is trimmed nose-down, and it probably remained in that condition for the duration of the flight. The nose-down pitching moment would have increased as the airspeed increased and the flaps and gear were retracted; this would have required added back pressure to maintain level flight. The pilot's attention was probably diverted slightly while making the transition to instruments, selecting gear and flaps up, and setting the engine power, and he did not maintain sufficient back pressure to maintain a positive rate of climb.

CONCLUSIONS:

Findings:
1. The pilot's take-off technique was not in accordance with the Piper Pilot's Operating Manual.

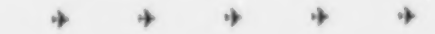
2. During the transition to instruments, the pilot's scan did not adequately identify and prompt the pilot to initiate a climb.

3. The pilot did not ensure that he had established a positive rate of climb and was clear of all obstacles before diverting his attention to selecting the gear and flaps up and setting climb power.

4. The pilot was convinced that the aircraft was in a climb because he had attained the "blue line" airspeed; however, since the aircraft was not trimmed for the climb, a climb was not established.

5. No discrepancies were found in the elevator trim system that would have prevented normal operation.

Causes:
The pilot's take-off procedure and instrument scan did not ensure that the aircraft was trimmed properly and established in a positive rate of climb.



EAGLE AIR SERVICES
CESSNA C185E SKYWAGON C-FAUC
BERNELL LAKE, SASKATCHEWAN 1 mi S
10 FEBRUARY 1989

BRIEF NUMBER: 89-C0031 (Accident)
LOCAL TIME: 0845 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	318	21
LAST 90 DAYS	21	21

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot landed the aircraft long on a frozen lake and made a left turn at high speed to avoid trees on the shoreline. During the turn, the left ski struck a large snow drift, and the left landing gear collapsed.

Because of the overcast sky and snow cover, the pilot had difficulty in judging the aircraft's height above the ground.

MINISTIC AIR LIMITED
CESSNA A185F SKYWAGON C-GERY
NORTH SPIRIT LAKE, ONTARIO
20 MARCH 1989

BRIEF NUMBER: 89-C0055 (Accident)
LOCAL TIME: 1100 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	6,500	2,000
LAST 90 DAYS	90	90

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

While the ski-equipped aircraft was taxiing after landing on North Spirit Lake, the right ski hit a rock hidden by the snow. The right landing gear broke, and the aircraft was substantially damaged.

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TRANS CÔTÉ INC.
CESSNA U206G STATIONAIR C-GILN
VIEUX-FORT, QUÉBEC
02 APRIL 1989

REPORT NUMBER: 89-Q0084 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1100 EDT
OPERATION: Specialty Aerial Ambulance and Mercy
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	873	137
LAST 90 DAYS	36	36

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

SUMMARY REPORT:

The pilot landed on the frozen surface of Vieux-Fort Bay, Québec, in the Strait of Belle Isle, for a medical evacuation. He did not notice any "slushy" condition on the landing area. About one-half hour later, after taking the passengers on board, the pilot taxied downwind at full power. The skis of the aircraft sank in the melting snow, and the pilot cut the engine and got out to get help. Once men from the nearby village arrived, they were asked to push the aircraft. Then the pilot started the engine and, with their help, was able to move the aircraft again. He used full power to increase speed so the skis would not sink in the snow. He attempted to turn downwind, but the aircraft took off prematurely. The pilot pulled back on the control column and cut power immediately, which resulted in a hard landing. The right wing struck the frozen surface, followed by the left horizontal tail and left wing. The nose landing gear failed, and the aircraft came to rest nose down. The three occupants were taken to the village, where the two passengers were examined and diagnosed to be in satisfactory condition.

The weather was verified before the initial take-off and was suitable for visual flight. The pilot said the winds were gusting between 12 and 25 knots during the take-off run. No official information source was available to confirm the condition of the surface of the bay.

He took the passengers on board and taxied the aircraft. When he realized that the surface of the bay was not suitable for taxiing, he applied full power to increase taxi speed. While taxiing at high speed, the pilot initiated the turn, and the aircraft took off prematurely. When the pilot pulled back on the control column and cut power, the aircraft landed heavily on the frozen surface.

CONCLUSIONS:

Findings:
1. Because of the condition of the surface on which he was taxiing, the pilot had to apply full power.

2. During the turn with a cross-wind component, the aircraft took off prematurely.

3. The pilot pulled back on the control column and cut power, which resulted in a hard landing.

Causes:
While taxiing for a take-off in unfavourable conditions, the pilot made incorrect control inputs.

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AIR ROBERVAL LIMITED
PIPER PA-31 NAVAJO C-GDBK
QUÉBEC CITY AIRPORT, QUÉBEC
14 APRIL 1989

BRIEF NUMBER: 89-Q0093 (Accident)
LOCAL TIME: 1657 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	711	9
LAST 90 DAYS	183	9

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

During a full-flap approach for runway 24 at Québec City Airport, the pilot cut power to idle while in the flare. He applied the brakes immediately after touchdown. The landing gear warning horn sounded, and the pilot realized that the aircraft was collapsing on its nose. After the accident, maintenance crews discovered that the landing gear lever was in the GEAR UP position.

The pilot stated that he had inadvertently retracted the landing gear rather than the flaps. He also stated that he lacked experience on this type of aircraft, that he was very tired, and that he usually retracted the flaps immediately after touchdown.

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CESSNA 172P C-GQLY
LYTTON, BRITISH COLUMBIA
20 APRIL 1989

BRIEF NUMBER: 89-P0094 (Accident)
LOCAL TIME: 1900 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	104	26
LAST 90 DAYS	55	26

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was en route to Pitt Meadows from Lilloet, British Columbia. As she approached Lytton, she encountered turbulence and decided to land at the Lytton Airport.

The winds at Lytton were from the south at 15 knots with higher gusts. To compensate for the winds, the pilot flew the final approach at a higher than normal airspeed. On touchdown, the aircraft bounced and ballooned. On the second touchdown, the aircraft bounced again, and, on the next touchdown, the nosewheel collapsed, and the aircraft nosed over.

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NORTHERN AIR CHARTER (PR) INC.
CESSNA 185 SKYWAGON C-GIRG
PEACE RIVER AIRPORT, ALBERTA
06 MAY 1989

BRIEF NUMBER: 89-W0089 (Accident)
LOCAL TIME: 1646 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,200	150
LAST 90 DAYS	180	50

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The aircraft was returning to the Peace River airport after completing a three and one half hour fire patrol in the Peace River area. The surface winds were approximately 260 degrees magnetic at 12 knots gusting to 17. The pilot completed a full flap approach to runway 22 at his normal approach speed of 75 knots indicated airspeed (KIAS) and crossed the threshold at 65 KIAS. The aircraft touched down in a three-point attitude approximately 400 feet past the threshold and had rolled about 100 feet when a gust of wind lifted the right wing. The aircraft ground looped to the right, and the left main gear collapsed. The aircraft turned 180 degrees and came to rest about 900 feet from the threshold. The left wing was bent outboard of the left strut, and all three propeller tips were curled. The pilot and one passenger, both of whom were wearing a shoulder harness, were uninjured.

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AIR BAFFIN LTD.
CESSNA U206G STATIONAIR C-FCIP
NEY HARBOUR, NORTHWEST TERRITORIES
14 MAY 1989

BRIEF NUMBER: 89-Q0113 (Accident)
LOCAL TIME: 0835 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	6,000	3,000
LAST 90 DAYS	35	18

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

The pilot and his three passengers departed Iqaluit, Northwest Territories on a pleasure flight, in good visual flight rules (VFR) conditions. The aircraft was not ski-equipped. The pilot chose to land approximately 75 miles south of Iqaluit, on an unprepared frozen portion of Frobisher Bay. The winds were light from the north, and a normal approach was executed. On touchdown, the main wheels broke through a thin layer of ice into soft snow and slush, and the aircraft nosed over.

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TRANS PROVINCIAL AIRLINES
BRISTOL 170 FREIGHTER WAYFARER C-FDFC
JOHNNY MOUNTAIN, BRITISH COLUMBIA
28 MAY 1989

BRIEF NUMBER: 89-P0123 (Accident)
LOCAL TIME: 1124 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	9,642	302
LAST 90 DAYS	167	167

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

During take-off from a gravel runway, the aircraft drifted off the right side of the runway. The pilot applied full left aileron and pulled the aircraft into the air. The aircraft hit a rock-lined ditch; the tail-wheel assembly was knocked off, and a large hole was punched in the underside of the left-hand horizontal stabilizer. The aircraft was flown to another airport where the skin on the rear lower fuselage was damaged on landing.

Because of impact damage to the tail-wheel assembly and tire, it was not possible to determine if the tire had blown on take-off or if the tail-wheel lock had failed. This type of aircraft has poor directional control characteristics at slow speeds, and a failure of either the tire or the tail-wheel lock would have made directional control difficult.

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AGRIC AIR INC.
PIPER PA-25-235 PAWNEE C-GBHO
LAC-MÉGANTIC, QUÉBEC
29 MAY 1989

REPORT NUMBER: 89-Q0134 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0630 EDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,400	70
LAST 90 DAYS	30	30

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot was on his second application flight of the morning. The aircraft had been in the air for about 20 minutes when, at the end of the third pass at a height of approximately 50 feet above ground level, as the pilot was pulling out to pass in the opposite direction, the engine (Lycoming 0-540-B2B5) suddenly stopped. The pilot immediately spotted a landing area to his left. While making a steep descending turn to the left, the pilot felt the left wing sink. He compensated with the rudder and pushed on the control column, but the left wing and nose struck the ground hard. The aircraft continued a short distance along the ground, then pivoted to the left about 140 degrees, and caught fire. The pilot lost

his helmet and glasses, and his non-flammable suit was splashed with fuel. The pilot quickly exited the cockpit and extinguished the flames that were burning his face and head.

Weather conditions were favourable for the flight. The winds were calm, and the outside temperature and dew point were not conducive to carburettor icing.

The investigation at the accident site revealed that, when the left wing struck the ground, it was tilted more than 30 degrees and its pitch angle was at least 35 degrees. The insecticide reservoir ruptured on impact, and the contents were sprayed forward over 40 feet. The ensuing fire completely destroyed the aircraft and almost all of the aft portion of the engine; consequently, no fuel or engine oil samples could be obtained.

A laboratory examination of the engine revealed that some teeth on the left crankshaft idler wheel had broken as a result of material overload. Based on several similar occurrences, it would appear that the overload and engine failure were caused by a sudden stoppage of the left magneto. The magneto of the accident aircraft was destroyed in the fire.

After the left crankshaft idler wheel failed in overload, which was caused by a sudden stoppage of the left magneto, the camshaft-governor drive gear and the fuel pump idler gear ceased turning and caused the engine to stop. Given the very low altitude of the aircraft, the area selected for the forced landing, the steep left turn, and the loss of airspeed, it is concluded that the impact of the left wing and nose with the ground was preceded by a loss of control.

CONCLUSIONS:

Findings:

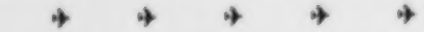
1. Some teeth on the left crankshaft idler wheel failed in overload, which was likely caused by a sudden stoppage of the left magneto.

2. After the left idler wheel failed, the associated accessories were no longer driven by it, and the engine stopped during a pull-out.

3. The pilot attempted an emergency landing in an adjacent field, but he lost control of the aircraft during a steep left turn.

4. The aircraft struck the ground and caught fire, and the pilot suffered serious burns. The aircraft was completely destroyed by fire.

Causes:
Some teeth on the left crankshaft idler wheel failed in overload.



AGNEW LAKE AIR SERVICES LIMITED
CESSNA A185E CF-AQK
WORTHINGTON, ONTARIO 2 mi N
31 MAY 1989

REPORT NUMBER: 89-O/0243 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1920 EDT (Approximately)
OPERATION: Commercial Non-Revenue
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	10,000*	N/A
LAST 90 DAYS	250	250

*Estimated

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	–	–	–

HISTORY OF THE FLIGHT:

The pilot of the float-equipped aircraft departed at 1900 eastern daylight time (EDT), westbound from Whitewater Lake to Agnew Lake, Ontario. A number two check, a cylinder change, and minor cosmetic repairs had been completed on the aircraft at a maintenance facility on Whitewater Lake. During the early evening, the pilot was informed by telephone from the base at Agnew Lake, on two different occasions, that poor weather existed west of the base and that it was moving easterly. Prior to departure, the pilot telephoned the base and stated that his arrival would be within the next half hour. A normal practice among company pilots when the weather conditions were poor was to fly along a hydro line that ran east to west, until Agnew Lake was reached, and then fly south along the lake to the base. The maintenance engineer at Whitewater Lake talked to the pilot prior to take-off, and the pilot did not state whether he would be flying along the hydro line.

When the aircraft became overdue at the base, it was assumed that the aircraft had entered poor weather conditions and that the pilot had landed at a nearby lake until the weather improved. The next morning, when the aircraft remained missing, a second aircraft from the Agnew base and two aircraft from local operators set out on a search. The three aircraft were unsuccessful in

locating the missing aircraft, and Search and Rescue (SAR) in Trenton was then notified. At 1230 EDT, Agnew base was informed that the wreckage had been located midway between the two lakes in dense woods. The aircraft had been destroyed by fire, and the pilot had sustained fatal injuries.

The wreckage was located approximately 1,200 feet south of the hydro line. Within 200 feet of the hydro line, the leading edge of the right wing was found in four large sections. All the sections had evidence of a spanwise cable strike. Evidence indicated that the aircraft struck the south shield wire. This wire did not carry electricity, and it was smaller in diameter and approximately 20 feet higher than the lower hydro cable. The aircraft struck the wire 200 feet above ground level.

Wreckage examination revealed that the aircraft struck the ground in a steep nose-down attitude, favouring a right wing and right float impact. A fire developed after ground impact and consumed the fuselage.

The pilot held a valid commercial pilot's licence, a medical licence, and an instrument flight rules Class 1 rating. There was no evidence that incapacitation, physiological, or psychological problems affected the pilot's performance.

The aircraft had been maintained in accordance with Transport Canada's standards as evidenced by a valid Certificate of Airworthiness.

The weight and center of gravity were within the prescribed limits, and the aircraft contained sufficient fuel to complete the 30-minute flight.

The aircraft's journey and technical logs were destroyed in the fire. Normally, the journey log travels with the aircraft, and the technical log remains at the aircraft's base. However, since the maintenance was being carried out at Whitewater Lake and the maintenance engineer's signatures had to be entered for the work completed, the technical log book travelled with the aircraft on this trip. The aircraft's maintenance and flying history had been recorded in the two books. The aircraft's times were taken from the renewal form for the Certificate of Airworthiness of the previous year, to which an estimated 400 hours flying time was added for the ensuing year, to approximate the total flying time since manufacture.

The engine was not examined during the investigation. However, several branches, measuring in width up to three inches, were cut by the propeller. The propeller was retrieved later, and the six attaching bolts were found to have been sheared. The clean tree cuts and the sheared bolts are indicative of a propeller being driven with substantial power.

The airframe inspection carried out at the Whitewater Lake maintenance facility was routine. During the engine inspection, the number five cylinder was found cracked from the spark plug to the fuel injector. The cylinder was replaced before the flight, and a ground run was reported to be uneventful.

The weather reported to the pilot during the phone conversations was a mixture of fog and rain moving in an easterly direction. At 1900 EDT, Sudbury Airport, located approximately 25 miles east of the accident site, was reporting a visibility of eight miles with a light drizzle, and wind from 220 degrees magnetic at nine knots. For the next four hours, weather reports indicated that the weather was progressively deteriorating. At 2300 EDT, the weather was reported as visibility one eighth of a mile with light drizzle and fog, and wind from 040 degrees magnetic at five knots. The weather front was moving in an easterly direction.

ANALYSIS:

The Agnew base informed the pilot of the poor weather conditions, but he decided to continue with the flight.

The aircraft was flying in an east-west direction, probably following the hydro line that ran in the same direction. Flying in this direction, the aircraft would have encountered the weather that was being reported at Sudbury from 1900 to 2300 EDT. The further west the aircraft flew, the poorer the conditions would have been.

Based upon the evidence at the accident site, it was determined that the aircraft was in a southbound heading at the time of impact. Because the aircraft missed the north shield wire and struck the south wire, the aircraft was probably in a descent and not in level flight. Whether the pilot decided to turn the aircraft and head toward Whitefish Lake to wait for more favourable conditions could not be determined.

CONCLUSIONS:

Findings:

1. The aircraft struck the south shield wire on a hydro line, 200 feet above the ground.

2. Visibility due to fog and drizzle was greatly reduced on the higher ground.

3. It was determined that the aircraft was heading in a southerly direction, possibly returning to Whitefish Lake, when it struck the wire.

4. The pilot held a valid licence and medical certificate.

5. There were no mechanical discrepancies with the aircraft.

6. The aircraft's weight and centre of gravity were within the prescribed limits.

7. There was sufficient fuel on board to complete the flight with a 45-minute reserve.

Causes:
The aircraft encountered poor weather conditions on route to its base and struck a hydro shield wire with its right wing, probably while turning back to its point of departure.

GILLAM AIR SERVICE (1985) LTD.
PIPER PA-32 CHEROKEE C-FVOK
KELSEY, MANITOBA
16 JUNE 1989

BRIEF NUMBER: 89-C0102 (Accident)
LOCAL TIME: 1010 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	320	36
LAST 90 DAYS	100	36

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was landing on the single runway and encountered subsiding air as he approached the threshold. He applied full power but was unable to arrest the descent. The aircraft touched down hard short of the runway on the upsloping overrun area. The landing gear collapsed, and the aircraft slid to a stop.

The wind was 80 degrees to the runway at about 15 knots.

A1 CUSTOM APPLICATORS LTD.
PIPER PA-25-235 PAWNEE C-GYOY
VIKING AIRPORT, ALBERTA 2 mi N
24 JUNE 1989

BRIEF NUMBER: 89-W0132 (Accident)
LOCAL TIME: 0700 MDT
OPERATION: Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	8,000	N/A
LAST 90 DAYS	150	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot departed Killam, Alberta to spray a field which was located two miles north of the Viking, Alberta airport. The hopper door was leaking chemical and after completing one spray run on the field, the pilot decided to land at Viking to clean the windshield. The winds were light to calm, and the visibility was good. There were several ruts in the runway and shortly after touchdown, the aircraft started to veer to the left. The pilot applied both brakes but the right brake was soft and, as the aircraft continued to swerve to the left, the right spray boom contacted the runway. The aircraft stopped at the left edge of the runway, having turned in excess of 90 degrees from the direction of landing. The pilot, who was uninjured, examined the damage and flew the aircraft to a maintenance facility for repair.

THORBURN AVIATION
CESSNA 185F SKYWAGON C-GFCJ
JUBILEE LAKE, NEWFOUNDLAND
26 JUNE 1989

REPORT NUMBER: 89-A0149 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1200 NDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	7,000	5,000
LAST 90 DAYS	150	100

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

SUMMARY REPORT:

The float-equipped aircraft with the pilot and three passengers aboard departed from Thorburn Lake, Newfoundland on a flight to Jubilee Lake, Newfoundland. The wind at the departure point was very light. Upon arrival at Jubilee Lake, the ceiling was approximately 1,500 feet above sea level, and a brisk wind was blowing from the north, estimated to be about 25 mph. A landing was attempted in a northerly direction along the shoreline on the west side of the lake. A few seconds prior to touchdown, the aircraft encountered a gust of wind from the left which lifted the left wing. The aircraft struck the water hard on the right float, breaking the right float strut attachment fittings. The aircraft then settled onto the float spreader bars and remained upright and afloat. After examining the damage, the pilot was able to start the engine and taxi to shore.

The pilot chose a landing path toward a point of land jutting out into the lake, which formed a cove about one quarter of a mile long. He planned the touchdown to be near, but outside this point of land. Just before touchdown, a gust of wind funnelled out of this cove and lifted the left wing.

The right front float strut fuselage fitting, the right rear float strut fuselage fitting, and the right front float strut float fitting were all fractured. These fittings were examined, and it was determined that they all broke in overload. There was no indication of any pre-cracking. The remainder of the float strut assembly was severely damaged.

CONCLUSIONS:

Findings:
1. As the aircraft was about to touchdown, a strong gust of wind from the left was encountered which lifted the left wing.

2. The aircraft landed heavily on the right float, breaking the float strut attachment fittings.

3. The float strut attachment fittings fractured due to overload.

Causes:
The pilot was unable to control the aircraft when he encountered a strong cross-wind gust prior to touchdown.

TRANS PROVINCIAL AIRLINES LTD.
BRISTOL 170 MK31 WAYFARER C-GYQS
WINDY CRAGGY, BRITISH COLUMBIA
29 JUNE 1989

BRIEF NUMBER: 89-P0160 (Accident)
LOCAL TIME: 2030 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	9,698	395
LAST 90 DAYS	152	152

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot carried out a normal, three-point landing, which was followed by strange noises, vibrations, and a very short roll-out. The tail-wheel assembly had failed during the landing, and the aircraft came to rest on its underside. The sequence of the failure was not determined.

BI-AIR APPLICATION SERVICE
GRUMMAN G164A AGCAT C-GDYG
CLANDONALD, ALBERTA 10 mi N
09 JULY 1989

BRIEF NUMBER: 89-W0143 (Accident)
LOCAL TIME: 1200 MDT
OPERATION: Aerial Application
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	2,850	300
LAST 90 DAYS	150	80

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The aircraft was operating from a narrow rural road in order to spray an adjacent farm field. Upon landing to reload with chemical, the pilot lost directional control of the aircraft, which then swerved off the road into a ditch and nosed over. There was a quartering tail wind present on landing.

The pilot did not normally fly this particular aircraft, and he had not adjusted the rudder pedals to accommodate his size. He stated that he was not able to apply corrective rudder and brakes at the same time.

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SUNRISE AVIATION (1984) LTD.
CESSNA 185 SKYWAGON C-FEKI
TAWEEL LAKE, BRITISH COLUMBIA
13 JULY 1989

REPORT NUMBER: 89-P0176 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1745 PDT
OPERATION: Charter
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,405	N/A
LAST 90 DAYS	232	232

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	1	1	–

HISTORY OF THE FLIGHT:

The aircraft had been chartered to fly guests into a fishing lodge at Taweel Lake, British Columbia from McLure, British Columbia, about 45 miles to the south. Earlier that afternoon, the aircraft had completed two round trips, and it was on its third trip to Taweel Lake, with two more guests and their baggage.

The aircraft was observed to approach from the south, pass over the lodge, which is located at the southeast end of a narrow bay, then turn left and proceed southeast, following the far side of the bay at or near tree-top level. As it approached the lodge, the aircraft entered a steep left turn which would have positioned it for a landing to the northwest. As the turn steepened, the aircraft's nose dropped and the aircraft struck the water in a steep nose-down, left-banked attitude. A passenger in the rear of the aircraft was seriously injured; the pilot and front seat passenger were fatally injured. The aircraft was destroyed.

PERTINENT INFORMATION:

Taweel Lake is at an elevation of 3,990 feet, is four miles long, and has an average width of about one-half mile. The bay where the fishing lodge is situated is at the southeast end of the lake and is 1,000 feet wide and bordered by tall trees.

Witnesses at the lake, including passengers who were flown in on the two earlier flights that afternoon, stated that a thunderstorm had passed through the area while they were awaiting the arrival of the third flight. However, the worst of that weather had passed before the aircraft arrived, and the wind had changed from a southerly to a northerly direction and was estimated at 10 to 15 mph. When the aircraft arrived, the sky was overcast at about 1,000 feet, the visibility was good, and light rain was falling.

The pilot was experienced and qualified for the flight. There was no evidence that incapacitation, physiological, or psychological factors affected the pilot's performance.

The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures. The weight and centre of gravity were within the prescribed limits.

The aircraft had been modified in May 1988 when the Sportsman STOL kit (STC SA2272) and B and M Flap Gap Seals (STC SA 150NW) were installed.

After the accident, the engine was recovered, and it was successfully run on a test stand. The wreckage was

examined, and it was determined that two notches of flap had been extended at the time of impact. Continuity of the flight controls was confirmed, and no pre-impact failure or malfunction of the aircraft was found.

The aircraft struck the water in a steep left-banked, nose-down attitude. The two front float struts separated from both the aircraft and floats, and the front spreader bar broke. The forward half of the left float was bent up and broken open while the right float was damaged in the mid-length area. The left and right floats struck the underside of their respective wings. The left wing strut had already separated from the wing when the wing struck the water, and the right float deformed the right wing strut. The cabin door posts were broken during the impact.

After the aircraft struck the water and sank, the rear-seat passenger came to the surface and was rescued by witnesses who launched boats from the fishing lodge dock. This passenger has no recollection of leaving the aircraft, but his seat-belt was found to be unfastened, and the extent of his injuries make it unlikely that he could have unfastened the belt.

Neither the pilot or the front seat passenger was wearing the diagonal shoulder harness that was available to them. Both sustained incapacitating impact injuries.

On the morning of the accident, the pilot had completed two flights to other destinations then waited at McLure for two hours until the passengers for Taweel arrived at about 1415 PDT, 45 minutes later than anticipated. He then completed two flights, with four passengers each, to Taweel Lake. On both occasions, with the wind from the south, the pilot overflew the lodge, heading toward the north, then made a left turn to land back toward the lodge, in a southeasterly direction, coming off the step well out in the lake and taxiing in.

Following the third flight to Taweel Lake, the pilot had intended to fly six passengers who were already waiting at McLure, to Bare Lake. Also, there were people waiting at Hoopy Lake to be flown to McLure, and there was an additional flight to be made to Taweel Lake with baggage before the pilot could return to his home in Salmon Arm before darkness. Provided there were no further delays, it is estimated that it would have taken the pilot until 2215 PDT to have accomplished this. Grounding time due to darkness was at 2141 PDT.

ANALYSIS:

A thunderstorm passed over Taweel Lake while the pilot was making the return flight to McLure to pick up the two remaining passengers of this group. The worst of the storm had passed before the aircraft returned to the lake, but the wind had changed 180 degrees and was now blowing from the north. Presumably the pilot recognized the wind shift as he overflew the lodge and was manoeuvring to land into wind, near the lodge. He turned left and followed the shoreline at tree-top height on the far side of the lodge until close to the lodge, then entered a steep left-hand turn. It was during this final turn that the aircraft stalled at an altitude too low for the pilot to recover before striking the water. It could not be determined why the pilot performed a steep turn, but it is possible that he misjudged the width of the bay and steepened the turn in an attempt to remain over the landing area, close to the lodge.

The aircraft had been modified the previous year by the installation of a STOL kit and flap gap seals which may have made the pilot overconfident in the aircraft's low speed manoeuvrability and capacity to complete the turn safely. Also, the pilot was probably becoming more aware of the fact that he would have difficulty in completing the day's flying activities before dark, and he may have been attempting to reduce his manoeuvring to the minimum in an effort to save time.

If the pilot and front seat passenger had been wearing the diagonal shoulder harness that was available, it is possible that the injuries they sustained would have been less severe, thus enabling them to escape from the sinking aircraft.

CONCLUSIONS:

Findings:

1. The aircraft made a steeply banked turn at low altitude.

2. The aircraft stalled in the turn and struck the water.

3. The steep turn was being made in a confined bay.

4. The available shoulder harness was not worn by either the pilot or the front-seat passenger.

Causes:

The pilot made a steeply banked turn at low altitude, and the aircraft stalled.

CESSNA TR182 SKYLANE C-GCIY
PEMBROKE AIRPORT, ONTARIO
18 JULY 1989

BRIEF NUMBER: 89-O/0333 (Accident)
LOCAL TIME: 0900 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	510	150
LAST 90 DAYS	170	150

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

REPORTED CIRCUMSTANCES:

After take-off, the pilot selected the landing gear up and established the aircraft in an en route climb. The pilot smelled something burning and noticed smoke accumulating at the rear of the cabin. He declared MAYDAY on the UNICOM frequency and returned to Pembroke Airport for an immediate landing. During the approach, the pilot turned the fuel selector valve to the fuel shut-off position, pulled the mixture control to idle cut-off, selected 20 degrees of flap, and then shut off the master switch. The landing gear was not extended, and the aircraft landed on its belly. Maintenance checks revealed that the smoke was caused by a blown seal in the turbocharger unit, thus allowing engine oil to escape and settle on hot engine components.

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AGRIC AIR INC.
PIPER PA-25-260 PAWNEE C-FOSL
ÎLE D'ORLÉANS, QUÉBEC
20 JULY 1989

BRIEF NUMBER: 89-Q0206 (Accident)
LOCAL TIME: 0900 EDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	390	91
LAST 90 DAYS	76	74

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The pilot was terminating a ferry flight. During the landing on a narrow dirt road with an 18-knot cross-wind from the right, the aircraft drifted to the left. As the aircraft was difficult to control, the pilot increased power, but the aircraft drifted further to the left and into a potato field. The pilot was unable to apply the brakes in time to avoid a small lake at the edge of the field. The aircraft entered the water and turned over.

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ALBERTA BANNER TOW
PIPER PA-22-150 TRIPACER C-FCRF
AIRDRIE, ALBERTA
29 JULY 1989

REPORT NUMBER: 89-W0176 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1400 MDT
OPERATION: Specialty Aerial Advertising
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	270	7
LAST 90 DAYS	7	7

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	1	-
PASSENGERS	-	1	-

SUMMARY REPORT:

The pilot was attempting to pick up and tow an aerial advertising banner when he heard a bang at about the same time as the aircraft's trailing grapple hook should have caught the intended tow line. He was unable to maintain a normal climb speed of about 100 mph, and he attempted to release the banner; however, the situation did not improve, and he turned left. The aircraft continued to lose airspeed and stalled into a barley field, causing substantial damage to the aircraft. The occupants sustained serious injuries.

The pilot thought he was too high during the pick-up run, and, in an attempt to engage the aircraft's trailing grapple hook with the banner tow line, which was stretched between two poles, he entered a dive. The nosewheel assembly struck the top of the left pole and snagged the tow line. An immediate climb was not initiated, and the banner was dragged across the airport into a barley field. As the banner dragged through the barley crop, the aircraft decelerated, and soon drag overcame the lift capability of the aircraft. The pilot attempted to

land straight ahead, but the aircraft stalled, and the pilot lost control of the aircraft.

The banner is normally picked up by a tow hook connected to a quick release installed on the tail of the aircraft. A release lever is installed in the cockpit to enable the pilot to release the banner. In this instance, release of the banner was not possible because the tow line was snagged on the nosewheel assembly.

The pilot misjudged his approach, and, after hearing the bang, he hesitated in his initial climb long enough to allow the banner to be dragged through the barley crop. Although he realized the resistance produced by the dragging banner was rapidly reducing his flying speed, the aircraft stalled before he was able to force-land under control.

CONCLUSIONS:

Findings:
1. The pilot misjudged the approach and hit the pick-up pole.

2. An immediate climb was not commenced after the pick up.

3. The tow line snagged on the nosewheel assembly, preventing the pilot from releasing it.

4. The resistance produced by the dragging banner caused the aircraft to stall before a successful forced landing was completed.

Causes:
The pilot did not commence an immediate climb after inadvertently snagging a banner, which resulted in a loss of airspeed and a subsequent stall from which recovery was not possible.

AGRIC AIR INC.
PIPER PA-25-235 PAWNEE C-GUJD
SAINT-VALÉRIEN, QUÉBEC
30 AUGUST 1989

REPORT NUMBER: 89-Q0250 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1456 EDT
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,111	166
LAST 90 DAYS	140	140

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	–

SUMMARY REPORT

The pilot was flying at an altitude of 1,100 feet above sea level (asl) on a ferry flight to his base. The aircraft had been flying for 1 hour and 42 minutes and was about four miles from destination when the engine misfired several times and stopped. The pilot made a forced landing in a field. On short final, he had to manoeuvre to avoid a hydro line which he saw at the last moment. The aircraft stalled, landed hard, and ground looped. The right wing and landing gear were torn off, and the pilot suffered a fractured left wrist.

Immediately prior to the accident flight, the pilot made a flight lasting 1 hour and 12 minutes, then topped up with 27.5 U.S. gallons (104.2 litres) of fuel, which he placed in the tank himself. Following the accident, it was observed that the fuel tank was empty. Tests revealed no leaks in the tank or fuel system. The pilot indicated that, during the ferry flight, the engine was operating at 2,350 rpm and the fuel mixture control indicated maximum richness. The aircraft's centre of gravity was about one-half inch aft of the prescribed limit.

The pilot stated that he normally used the performance data provided by his employer, which indicate an endurance of two hours based on an hourly fuel burn of 15 U.S. gallons and a tank capacity of 35 U.S. gallons. The data published by the manufacturer indicate that the aircraft's hourly fuel burn in this configuration is 16 U.S. gallons. The pilot stated that he had never calculated the actual fuel burn of the aircraft.

Existing air regulations require aircraft departing on a visual flight to carry sufficient fuel on board, taking weather forecasts into account, to fly to the destination landing point plus 45 minutes at normal cruising speed.

The fuel starvation occurred 1 hour and 42 minutes into the flight. Based on the previous flight, which lasted 1 hour and 12 minutes and consumed 27.5 U.S. gallons of fuel, the actual fuel burn is 23 U.S. gallons per hour. As the capacity of the tank is 38 U.S. gallons, the actual endurance of the aircraft is 1 hour and 42 minutes. This endurance time corresponds to the flying time elapsed as of the fuel starvation.

With the centre of gravity located one-half inch aft of the prescribed limit, the aircraft had a significantly greater tendency to stall when the pilot manoeuvred to avoid the hydro line.

It could not be determined why the hourly fuel burn was greater than the rate used by the pilot. As the fuel burn clearly varies with the age and condition of the engine and accessories, consumption may in some cases exceed published data. Consequently, the specifications published by the manufacturer should not be used in all cases. Rather, operators should determine the actual hourly fuel burn for the specific aircraft being used and allow for the regulation 45-minute reserve at cruising speed in their flight plans.

Fuel management was not properly carried out. The pilot used inaccurate fuel burn data. As he did not use the actual hourly fuel burn for the aircraft he was flying and did not allow for the regulation 45-minute reserve, the flight was interrupted when the engine stopped because of fuel starvation. With the centre of gravity located aft of the prescribed limit, the aircraft stalled and crashed when the pilot manoeuvred to avoid a hydro line on the forced landing.

CONCLUSIONS:

Findings:

1. Fuel management was not properly carried out.

2. The engine stopped because of fuel starvation.

3. The centre of gravity was one-half inch aft of the prescribed limit when the engine stoppage occurred.

4. The aircraft stalled and crashed following a manoeuvre to avoid a hydro line on the forced landing.

Causes:

Fuel management was not properly carried out.

BEECH 95C55 BARON C-FYAS
SLAVE LAKE, ALBERTA
03 SEPTEMBER 1989

REPORT NUMBER: 89-W0217 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2150 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	2,250	200
LAST 90 DAYS	5	5

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	1	2

SUMMARY REPORT:

The aircraft departed Margaret Lake, Alberta on a night visual flight to Slave Lake, Alberta. The pilot approached the destination airport at a height of 2,100 feet above ground. During the turn to final for runway 27, the pilot realized he was much too high, and he side-slipped the aircraft to the right for approximately 20 seconds to increase the rate-of-descent, achieving a bank angle of 30 degrees while maintaining 1,700 rpm on the engines. He then reduced power and side-slipped left for 15 to 20 seconds. As he levelled the wings and advanced the throttles to stabilize the approach, both engines stopped. The pilot's attempts to restart the engines were unsuccessful despite the use of boost pumps and reselection of fuel tanks. Seconds later, as the aircraft neared the ground, the pilot raised the nose to avoid hitting a ditched road which crossed his flight path. The aircraft stalled beyond the road and struck the ground approximately 950 feet short of the threshold to runway 27. The pilot and two passengers received minor injuries, and the third passenger sustained serious injuries. The aircraft was substantially damaged.

All fuel tanks were drained following the accident. It was determined that the right main, the right auxiliary, and the left auxiliary tanks each contained seven and one-half U.S. gallons of usable fuel. The left main tank, which was noted to be leaking because of impact damage, contained one-half U.S. gallon of usable fuel. The right main fuel cell was of a baffled design, and the left main fuel cell was unbaffled. The main tanks have a usable capacity of 37 U.S. gallons, and the auxiliary tanks have a usable capacity of 31 U.S. gallons.

Both engines performed normally during ground runs following the accident, and no mechanical discrepancies in the aircraft fuel system which would have caused a

sudden loss of power were identified. The pilot reported he selected both fuel selectors to main and both mixtures to rich before starting the approach. The aircraft flight manual identifies several fuel management limitations to prevent engine fuel interruption during critical flight manoeuvres. The maximum slip or skid duration is 20 seconds for aircraft fitted with unbaffled main fuel tanks and 30 seconds for aircraft equipped with baffled main fuel tanks.

It was determined that the lights which illuminate the fuel selector console did not function. The left light bulb was missing from the socket, and the right light bulb was burned out. The pilot reportedly used a flashlight to determine the fuel selector position during the en route portion of the flight but was unable to visually determine fuel selector positions during the approach.

The pilot attempted to correct the high approach by side-slipping the aircraft. The fuel quantity was less than one-quarter in each main tank, and the uncoordinated flight manoeuvre displaced the fuel enough to uncover the fuel tank outlets. Both engines stopped because of fuel starvation, and the pilot was unable to recover engine power before the aircraft stalled and struck the ground short of the runway.

CONCLUSIONS:

Findings:
1. The fuel selector console was not illuminated.

2. Both engines lost power because of fuel starvation as a result of prolonged side-slipping with a low fuel quantity.

3. The engine stoppage occurred at an altitude which did not afford enough time to successfully restart the engines.

4. The aircraft stalled during the forced approach and struck the ground 950 feet short of the runway threshold.

Causes:
Both engines lost power because of fuel starvation during side-slipping manoeuvres. The aircraft stalled and undershot the runway during the forced landing.

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B.C. YUKON AIR SERVICE
DE HAVILLAND DHC-2 BEAVER C-FHGZ
UNNAMED LAKE, BRITISH COLUMBIA
06 OCTOBER 1989

BRIEF NUMBER: 89-P0273 (Accident)
LOCAL TIME: 1400 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	9,500	3,000
LAST 90 DAYS	178	178

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	2

REPORTED CIRCUMSTANCES:

The pilot, with two passengers on board, was taking off from the lake when he encountered strong gusting winds and decided to abort the take-off. The aircraft landed back on the lake, but the landing area remaining was insufficient for the aircraft to come to a stop before it struck the shore. The occupants were not injured, but the aircraft was substantially damaged.

The lake, which is oriented roughly north/south, is about one and one quarter miles long and is at an elevation of 3,700 feet. The pilot took off toward the south and climbed to about 20 feet before aborting the take-off. He reported that the wind was from the southeast gusting from 15 to 25 mph with peak gusts of 30 mph.

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LA LOCHE AIRWAYS LTD.
NOORDUYN NORSEMAN MK5 C-FBHS
CREE LAKE, SASKATCHEWAN
11 OCTOBER 1989

BRIEF NUMBER: 89-C0200 (Accident)
LOCAL TIME: 1545 CST
OPERATION: Charter
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,500	450
LAST 90 DAYS	250	250

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The pilot had attempted several times to start the aircraft engine. When the engine finally started, it backfired twice and then began to run smoothly. As the pilot taxied out on the lake, he noticed black smoke coming through the floor and realized that the aircraft had caught fire. He decided to keep the engine running and attempt to return to the dock. However, the flames became too intense, and the pilot was forced to jump into the cold water before reaching the shore. The wind carried the aircraft towards the open water where it was destroyed by the fire.

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AIR SASKATCHEWAN AVIATION LTD.
DE HAVILLAND DHC-2 BEAVER C[illegible]-GHY
LA POINTE LAKE, SASKATCHEWAN
13 DECEMBER 1989

BRIEF NUMBER: 89-C0230 (Accident)
LOCAL TIME: 1030 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,200	200
LAST 90 DAYS	147	83

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was attempting to take off from the frozen lake with two 45-gallon drums of fuel on board the ski-equipped aircraft. He started the take-off into wind which was from about 170 degrees at five knots. As soon as the aircraft became airborne, the pilot selected the flap indicator up and pumped the handle slightly to the climb position. However, the flaps retracted completely, and the aircraft began to settle back onto the snow. The pilot decided to abort as he believed the aircraft would not be able to climb over the trees if he continued to attempt the take-off in the remaining distance available. He retarded the throttle and pushed the aircraft onto the lake surface, but there was not enough time to stop before the aircraft struck the shoreline at a speed of about 10 to 15 miles per hour. The aircraft was substantially damaged. Maintenance found that the flap actuator and the fluid line were leaking hydraulic fluid. A few days prior to the accident, during a training flight, the flaps had inadvertently retracted completely when partial flap was selected after take-off.

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GRONDIN TRANSPORT INC.
PIPER PA-23-250 AZTEC C-FWSL
VICTORIAVILLE, QUÉBEC
6 JANUARY 1990

BRIEF NUMBER: 90-Q0012 (Accident)
LOCAL TIME: 0744 EST
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,500	25
LAST 90 DAYS	85	14

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The pilot and his passenger took off at night from St-Frédéric airport, Québec. During the take-off roll, the aircraft veered to the left of the runway center line and the left main landing gear struck a snowdrift on the runway edge, just before the aircraft reached rotation speed. The aircraft then took off and the flight was uneventful until it reached its destination. However, towards the end of the landing roll, the left strut anchoring fixture attached to the drag link failed and caused the gear to collapse. The aircraft came to a stop on the runway and no one was injured.

The pilot stated that a thin layer of snow and the fact that snowdrifts obstructed the runway lights had made him lose sight of the runway center line during the take-off roll.

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CESSNA C185F SKYWAGON C-GJGO
NASH CREEK HOTSPRINGS, YUKON
07 JANUARY 1990

BRIEF NUMBER: 90-W0008 (Accident)
LOCAL TIME: 1200 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	19,270	570
LAST 90 DAYS	50	30

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was advised during radio transmissions that the customer, a trapper, had packed the snow on the airstrip in preparation for the landing. On arrival at the 1,200-foot strip, the pilot saw that fresh snow had fallen, and feeling that the surface might not be packed hard enough, he decided to not use wheels and pumped the skis down. After touchdown, partial whiteout conditions made it difficult for the pilot to determine where the end of the strip was. Rather than immediately rejecting the landing, he hesitated and consequently was committed to continue with the landing. Because the surface underneath the snow was slippery, the pilot was unable to stop the aircraft before the end of the strip. The aircraft ran off the end of the strip and fell into a steep ravine.

KENN BOREK AIR LTD.
DE HAVILLAND DHC-6-300
TWIN OTTER C-FDHB
ELLEF RINGNES ISLAND,
NORTHWEST TERRITORIES 50 mi N
28 MARCH 1990

BRIEF NUMBER: 90-C0049 (Accident)
LOCAL TIME: 1330 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	24,550	2,743
LAST 90 DAYS	93	26

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

During the latter part of the landing roll on Polar Sea ice, the nose ski struck an ice hummock which caused some buckling of the aircraft bulkhead at Station 60. The sky condition at the time of the occurrence reduced contrast with the polar ice and prevented the ice hummock from being seen until it was too late to avoid hitting it. The operator's assessment was that the extreme low temperature of minus 46 degrees Celsius at the time of the occurrence allowed little flex in the aircraft structure and led to greater damage than would have occurred otherwise.

CESSNA 150H CF-WHT
LYNCREST AERODROME,
WINNIPEG, MANITOBA
03 JANUARY 1989

REPORT NUMBER: 89-C0005 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1630 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	104	104
LAST 90 DAYS	84	84

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The pilot of the wheel-equipped aircraft flew a full circuit as he returned to his home aerodrome after an overnight fishing trip. The sun was low in the sky, but he could see where the rolled portion of the snow-covered runway began, and he could see that the wind was light. The aircraft touched down short, in about one foot of snow, and nosed over, coming to rest about 300 feet short of the rolled portion of the runway. Neither the pilot nor his passenger was injured.

The pilot had flown the previous morning to a lake where the aircraft landed safely in the loose snow cover. Planning to return that afternoon, the pilot and passenger alternately fished and shovelled a path for the take-off run. The pilot made two attempts to take off, but, as the main wheels rolled off the path into the snow, the aircraft slowed so that it did not get airborne in the length of run available. Getting the aircraft back to the path as well as more shovelling left the pilot and passenger quite exhausted. As the light was fading, they decided to spend the night in a cabin they knew was within hiking distance. The pilot broadcast their intentions on the aircraft radio but heard no reply.

They made the approximate two-hour hike to the aircraft the next morning. They then spent about three hours shovelling a longer, wider, take-off path, and the aircraft became airborne on the first attempt.

Weather conditions were excellent; it was a crisp, clear winter day with a light wind. The sun was low in the sky and the runway at his home aerodrome was snow covered. The runway had been rolled for a portion of its length, and that portion was marked with cones. The pilot was familiar with the aerodrome, having flown in or out about 30 times in the previous 35 days.

Despite his knowledge of the aerodrome and the care he took to check the runway from circuit height, the pilot landed short of the usable runway. The following three factors may have contributed to this accident: the snow cover on the aerodrome that made depth perception more difficult, the low sun that impaired the pilot's view of the landing area, and the physical fatigue of the pilot.

CONCLUSIONS:

Findings:
1. The pilot landed well short of the usable portion of the snow-covered runway.

2. The sun was low in the sky.

3. The weather was not a factor.

4. The pilot was familiar with the aerodrome and its condition.

5. The pilot had several hours of heavy exertion on the day before and on the day of the accident.

Causes:
It is probable that physical fatigue, combined with a snow-covered aerodrome and the sun low in the sky, prevented the pilot from correctly judging his approach path.

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CESSNA 172 SKYHAWK C-FQTC
THUNDER BAY, ONTARIO 93 mi N
03 JANUARY 1989

REPORT NUMBER: 89-C0007 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1129 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	119	119
LAST 90 DAYS	50	50

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The aircraft departed Kenora, Ontario at 0900 CST on a visual flight rules (VFR) flight to Timmins, Ontario with a planned fuel stop at Geraldton, Ontario. The engine (Lycoming 0-320-E2D) began to run rough and lose power. The pilot selected carburettor heat, and the engine regained power for a short time then began to run rough and lose power again. The pilot transmitted a distress call indicating that the engine was losing power and that he was carrying out a forced landing. The pilot selected a snow-covered, long, narrow lake. On final approach, a few feet above the lake surface, the engine regained power, but the pilot closed the throttle and landed. The left wheel settled through the loose snow and dug into the slush, and the aircraft nosed over. The emergency locator transmitter (ELT) was activated by the force of the accident. The uninjured pilot and passenger, who had been wearing their lap belts and shoulder harnesses, exited the aircraft with little difficulty. They were picked up two hours later by a rescue helicopter dispatched from Thunder Bay, Ontario.

The pilot had experienced a momentary power loss on several occasions earlier in the trip, but each time the engine recovered before altitude was lost. The pilot had diverted to Winnipeg, Manitoba the previous day and had the engine checked, but no fault could be found. No further difficulty was experienced until the engine began to run rough just prior to the accident.

The fuel strainer was checked and found to be clear of any contamination except for a small amount of ice in the base of the strainer bowl. The carburettor heat and engine controls were checked, and their operation was normal. The carburettor was removed, dismantled and found clean; however, the float had wear marks on the base from rubbing on the bottom of the fuel bowl. The moulded cellular floats showed no signs of fuel absorption. The needle valve was checked, and no fault was found with its operation. The fuel system was examined for any restriction but none could be found, and the fuel selector operated normally. The flexible fuel line from the strainer to the carburettor was checked and found clear of any obstruction. The ignition system was examined, and no abnormalities were found.

The pilot said that the aircraft was being operated with the fuel tanks selected to BOTH and that the fuel levels in both tanks dropped at the same rate.

The only way that the carburettor floats could wear on the bottom surface is if the fuel level dropped, allowing the floats to contact the bottom of the fuel chamber. There would have to be a restriction in the fuel flow for this to occur; this restriction had to be located between the fuel strainer and the fuel selector because the pilot reported that the levels in both tanks went down at the same rate. Because of the resumption of power just prior to the forced landing, the source of the blockage could not be found.

Although no restriction was found, it is considered most probable that there was a blockage in the fuel line between the selector and the fuel strainer.

CONCLUSIONS:

Findings:

1. The engine lost power probably because of a restricted fuel flow.

2. The source of the fuel restriction flow could not be determined.

3. The carburettor floats were worn on the bottom from contact with the bottom of the fuel chamber.

Causes:

The engine lost power probably because of a restricted fuel flow, the source of which could not be determined.

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PIPER PA-23-250 (AZTEC) C-GOLQ
VANCOUVER, BRITISH COLUMBIA 48 mi E
03 JANUARY 1989

REPORT NUMBER: 89-P0004 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1312 PST
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,000	200
LAST 90 DAYS	225	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	1	2

SUMMARY REPORT:

The pilot and three passengers were returning from a ski holiday. After obtaining a telephone weather briefing from the Penticton Flight Service Station (FSS), the pilot filed an instrument flight rules (IFR) flight plan from Penticton to Vancouver at an en route altitude of 12,000 feet above sea level (asl). Shortly after take-off, as the flight approached Princeton, Vancouver Area Control Centre (ACC), Kamloops Sector, advised the pilot

that severe turbulence and heavy icing had been reported by a pilot on a flight west of Princeton. The pilot acknowledged receipt of this information, and, following his request to climb, the aircraft was cleared to climb and maintain 14,000 feet. The pilot reported instrument meteorological conditions at that altitude, and he was later advised that, west of Princeton, convection-type cloud extended to 25,000 feet with cloud tops up to 28,000 feet. Seventy miles west of Vancouver, the pilot requested a descent and was cleared to 10,000 feet but not before the controller again advised him of the severe turbulence and moderate to heavy icing reported at that altitude between Princeton and Hope. The pilot indicated that he was experiencing only light rime icing at that time.

Over Hope, during the descent through 12,500 feet asl, signal reception of the Vancouver very high frequency omnidirectional range (VOR) navigation facility was interrupted. ACC provided the pilot with a radar vector so that he could stay on the airway until reliable reception of the Vancouver VOR was re-established. The pilot reported continuous light rime icing on descent through 11,000 feet and requested a further descent clearance at that time. He was then cleared to 7,000 feet, the minimum radar vectoring altitude for that area.

At 1307 Pacific standard time (PST), the pilot reported levelling off at 7,000 feet and requested a lower altitude. The Vancouver arrival controller told the pilot that a lower altitude was not possible at that time; but, if there was a problem, he could be vectored south, off the airway, toward lower terrain. The offer was declined. The controller asked the pilot if he was "picking up any ice" and if he could maintain 7,000 feet. The pilot replied that the icing was light and that he was "Okay." However, within one minute, the pilot indicated that he needed a lower altitude. He was then observed to have descended to 6,000 feet without a clearance. Two minutes later, the controller was able to clear the pilot down to the emergency descent altitude of 6,000 feet. The pilot was also advised that the Chilliwack Airport was eight miles south. When asked if he could maintain that altitude, the pilot said that he could; however, immediately following that remark, he transmitted that he had an engine problem and was not able to maintain altitude. The pilot then requested and received a vector toward Chilliwack. He also advised that one engine was shut down. No further radio communication was received from the aircraft after it disappeared from radar 47 miles east of the Vancouver VOR. As the aircraft descended below cloud, it entered heavy rain and ice pellet showers. The aircraft was unable to maintain altitude, and the pilot made an emergency forced landing in rugged terrain. The four occupants, one seriously injured, exited the aircraft before it was destroyed by a post-impact fire. Sleet and freezing rain persisted following the occurrence. At no time prior to the loss of communication with ATC did the pilot declare an emergency.

The transcribed weather broadcast valid from 1030 to 2230 PST and the Area Forecast (FA) valid from 1000 PST to 2200 PST, 03 January 1989, were available to the pilot at the Penticton FSS. Both forecast the presence of significant cloud development, turbulence, and icing along the flight-planned route. In particular, the FA indicated the presence of towering cumulus (TCU) convection-type cloud embedded in the overall cloud structure southeast of a frontal system that lay across the proposed route. Light occasional moderate rime icing in cloud could be expected between the freezing level and 18,000 feet. A moderate risk of severe rime icing between the freezing level and 12,000 feet existed in the vicinity and southeast of the front.

The freezing level was forecast to be about 8,000 feet lowering to 4,000 feet near the front. Moderate to severe mixed-clear icing was forecast in the convection-type cloud. Isolated cumulonimbus-type (CB) cloud with tops to 20,000 feet was forecast along with associated icing in cloud and ice pellet showers.

The aftercast weather report by the Environment Canada Pacific Weather Centre stated that it was likely that, at the time of the accident, the freezing level west of Princeton in the Hope area was about 10,000 to 11,000 feet with possibly a below freezing layer between 5,000 to 9,000 feet. The report indicated that this condition would likely have caused some moderate to severe rime icing at 12,000 feet with probable moderate to severe clear icing below 9,000 feet.

Wreckage analysis established that neither propeller was feathered at the time of impact. The engines were tested by the Canadian Aviation Safety Board and found to operate normally. The aircraft was not equipped for flight in icing conditions.

The pilot elected to continue flight into known icing conditions in an aircraft that was not suitably equipped. The forecast, the actual flight condition experienced by other aircraft, and the aftercast all indicated that icing conditions existed along the flight path.

Given the freezing levels indicated in the weather aftercast and the presence of rime icing in cloud and the likelihood of clear icing below 9,000 feet, a significant amount of ice probably accreted on the airframe and propeller throughout the descent. In the absence of any known mechanical deficiency, the engine difficulty experienced during the final descent was probably a function of impact ice restricting the air intake to the engine. This restriction would have limited engine power. Given the relatively high humidity and near freezing temperatures in cloud, carburettor or induction

system icing may also have adversely affected engine performance. Without wing deicing boots or heated propellers, the aircraft's flight performance would have been seriously degraded. The pilot's repeated requests for lower altitude down to and below the emergency radar descent altitude indicated that he was aware of the problem and had intended to continue descending until clear of the icing conditions. The pilot's failure to advise ATC of the developing situation precluded timely assistance by that agency and effective use of vectors away from high terrain.

CONCLUSIONS:

Findings:
1. The pilot continued flight into forecast icing conditions in an aircraft that was not equipped for such flight conditions.

2. The pilot was advised of the severe icing encountered by a previous flight along the flight-planned route.

3. Icing conditions encountered throughout the latter 20 minutes of flight adversely affected the aircraft's performance such that the aircraft could not maintain altitude.

4. The pilot did not declare an emergency or otherwise advise ATC of the developing situation and thus precluded timely assistance by that agency.

Causes:
The pilot continued flight into severe icing conditions in an aircraft that was not suitably equipped.

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FUNK B85C C-FUNZ
DRUMHELLER, ALBERTA
15 JANUARY 1989

BRIEF NUMBER: 89-W0014 (Accident)
LOCAL TIME: 1405 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	190	30
LAST 90 DAYS	2	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

As the pilot was about to land on the snow-covered runway, he became disoriented and could not distinguish the runway from the snow-covered grass on either side of the runway. The aircraft landed beside the runway, and, when the pilot realized he was not on the runway, he attempted to overshoot. He advanced the throttle rapidly and the engine stopped. The aircraft struck a snowbank and nosed over.

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PIPER J3 65C C-GVGM
CANDIAC, QUÉBEC
18 JANUARY 1989

BRIEF NUMBER: 89-Q0018 (Accident)
LOCAL TIME: 1505 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	363	361
LAST 90 DAYS	9	9

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was taxiing at low speed on a snow-covered field, in preparation for take-off to return to his departure airport. At the end of the field, the aircraft fell into a ditch 15 feet wide and 3 feet deep. The landing gear, propeller, and right wing were damaged.

Although the pilot had seen the ditch when he was on approach, he said that he could not see it while on the ground because the overcast conditions reduced visual contrast and the motor cowling obstructed his view. He acknowledged that he might have seen the ditch in time if he had zig-zagged while taxiing.

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PIPER PA-31-310 NAVAJO N33VW
INVERMERE AIRPORT, BRITISH COLUMBIA
21 JANUARY 1989

BRIEF NUMBER: 89-P0020 (Accident)
LOCAL TIME: 1230 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A.)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	572	504
LAST 90 DAYS	10	10

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

The pilot was on a visual flight rules (VFR) flight from Cranbrook, British Columbia to Invermere, British Columbia. The runway conditions for the destination airport were not available from the Cranbrook Flight Service Station; however, the pilot was advised that the Fairmont Airport, 10 miles south, was in use. En route, the pilot flew over the Fairmont Airport before proceeding to Invermere. Noting that the snow conditions appeared similar at both airports, the pilot decided to land. He conducted his approach to the 3,000-foot paved runway at a slower than usual speed and made a normal touchdown close to the threshold. The aircraft was slowing down and nearing the end of the runway when the pilot realized that there was ice under the snow and that he would be unable to stop on the runway. He attempted to steer the aircraft into the taxiway at the end of the runway, but the aircraft skidded into a snowbank where the main gear collapsed.

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PIPER PA-28-140 CHEROKEE CRUISER C-GPYH
MEELPAEG LAKE, NEWFOUNDLAND
28 JANUARY 1989

BRIEF NUMBER: 89-A0024 (Accident)
LOCAL TIME: 1330 NST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	643	375
LAST 90 DAYS	44	44

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

The pilot intended to land the wheel-equipped aircraft on a clear ice portion of the lake and to touch down as close as possible to the snow-covered portion to avoid having to use brakes. During the landing, the main wheels struck a two– to three-foot-high snow drift which extended out from an island and was not visible from the air. The aircraft nosed down, extensively damaging the nose gear and the propeller. The pilot unloaded the passengers and flew the aircraft to St. John's.

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BEECHCRAFT B-55 BARON C-GOBI
RICHMOND HILL, ONTARIO
29 JANUARY 1989

REPORT NUMBER: 89-O/0045 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2050 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	603	62
LAST 90 DAYS	16	16

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	1	–	–

HISTORY OF THE FLIGHT:

The pilot and passenger departed from Ottawa International Airport, Ontario on an instrument flight rules (IFR) flight to Toronto/Buttonville Airport. The en route portion of the flight was uneventful with no reported icing or turbulence. Prior to arriving at Buttonville, the pilot tuned to the automatic terminal information service (ATIS) and obtained the current weather information and the active runway, which was runway 21. The pilot prepared himself to do the non-directional beacon (NDB) approach to Buttonville, but, as he approached Buttonville, the pilot was asked by the air traffic controller if he would like the localizer approach to runway 15 or the NDB approach to runway 21. The pilot chose the localizer approach and was given radar vectors to intercept the localizer. As he intercepted the localizer, he was contacted by Buttonville Tower and was asked if he was inside or outside of the ELGYN fix. The pilot looked at the distance measuring equipment (DME) in the aircraft for the reading but was unable to read it because the passenger was using a flashlight to prepare charts for an approach to Toronto/Lester B. Pearson International Airport if an overshoot at Buttonville was required. The pilot then turned his attention to the course deflection indicator (CDI) of the number one very high frequency omnidirectional range (VOR) to ascertain his position on the localizer. The needle showed a full deflection to the left, and the pilot replied that he was inside the fix. Buttonville Tower asked the pilot to report when he was one mile on final. There was no further contact with the pilot, and a search was initiated minutes later. The aircraft was located three and one-half hours later, approximately five nautical miles from the threshold of the runway and one-fifth nautical mile west of the ELGYN fix. The pilot was seriously injured, and the passenger died from injuries received in the accident.

PERTINENT INFORMATION:

The pilot began his flying training in 1966. In 1969, he upgraded his private licence to a commercial licence, and, in 1971, he obtained a multi-engine rating. In October 1987, he wrote and passed the instrument exam and passed the instrument flight test in a single-engined aircraft, obtaining a Class II instrument rating. One year later in October 1988, the pilot passed a multi-engine instrument flight test and obtained a Class I Group I instrument rating in the accident aircraft. Since that time, he had accumulated approximately five hours of instrument flight experience which would have included possibly three or four instrument approaches and landings.

The aircraft had been maintained according to existing regulations, and there were no outstanding snags. Both engines and propellers were dismantled and examined. No pre-impact failures or unserviceabilities were identified. Both engines were determined to have been producing considerable power at impact.

The initial impact occurred just after the aircraft had crossed a level golf fairway. The aircraft struck six large spruce trees, each approximately 10 inches in diameter, which were situated on a hillside oriented approximately 90 degrees to the direction of flight. The aircraft was in a left turn with approximately 20 degrees of bank when it struck the trees about 15 feet above ground level (agl). The impact tore both wings from the aircraft and broke them into several sections. The fuselage continued travelling upright through the trees until it came to rest with the forward section about 75 feet from the initial impact point. The nose section of the fuselage had been torn open and displaced approximately 90 degrees to the left, which opened the fuselage immediately aft of the instrument panel. Both front seats and the occupants were thrown out ahead of the aircraft when both front seats failed. Ground elevation at the impact point was approximately 920 feet above sea level (asl).

The emergency locator transmitter (ELT) was located in the lower left corner of the fuselage just ahead of the vertical fin attachment. This area of the aircraft was damaged by tree impact which also destroyed the ELT. It was strictly by chance that a ground search party found the aircraft before daylight.

Before departing from Ottawa, the pilot phoned the local flight service station (FSS) and obtained a weather briefing. His briefing included the area forecast and the terminal forecasts for Ottawa, Buttonville, and Toronto. The Toronto area forecast called for local stratus ceilings of 200 to 800 feet agl, with visibilities reduced to three-quarter to three nautical miles in rain, light drizzle, or fog. He did not request, nor did he receive, the actual weather reports for any of the stations. The Buttonville regular special weather observation at 0200 eastern standard time (EST), approximately 10 minutes after the accident, was sky partially obscured, estimated ceiling 700 feet overcast, visibility one nautical mile in very light drizzle and fog, temperature three degrees Celsius, dew point one degree Celsius, and winds from 210 degrees at nine knots.

There are three navigational aids used for instrument approaches into Buttonville.

The number 2 Nav was found tuned to the Buttonville localizer. The Buttonville localizer and co-located DME provide distance information and a non-precision approach to runway 15. There were no reported outages or unserviceabilities associated with the localizer or DME. The localizer was flight tested on 31 January 1989 by the Department of Transport and was found to meet all the operational requirements of such a facility.

The minimum descent altitude (MDA) for the localizer approach is 1,080 feet asl (440 feet agl).

The number 1 Nav was found tuned to the Kleinburg very high frequency omnidirectional range tactical air navigation station (VORTAC). The Kleinburg VORTAC is located approximately 14 nautical miles west northwest of the Buttonville airport and provides course and distance information from the station. The Kleinburg VOR can be used as a reference to locate positions along the localizer for runway 15. The intercept point of the 075 degree radial and the localizer path is the intermediate fix (IF), 10 DME from the localizer station and five miles from the ELGYN fix. The number one Omni-Bearing Selector (OBS) was incorrectly set at 079 degrees somewhere between the IF and the ELGYN. There were no reported outages or unserviceabilities associated with the VORTAC. The aircraft DME was found selected to the Kleinburg VORTAC. When examined, the automatic direction finder (ADF) was found tuned to the Buttonville NDB. The Buttonville NDB broadcasts on a frequency of 248 kilohertz (kHz). The beacon is located 4.5 nautical miles northeast of the airport. There were no reported outages or unserviceablities associated with the NDB.

The ELGYN fix can be identified by any one of three methods while on the localizer for runway 15. The first, and normal method, is to select the localizer frequency on the aircraft DME and watch for a reading of five miles. The second is to use a second VOR receiver tuned to the Kleinburg VORTAC. If the OBS is selected to 104 degrees, the CDI will centre when the ELGYN fix is reached. The third method is to tune the ADF to the Buttonville NDB and watch for a bearing of 091 degrees. The aircraft should be at a minimum altitude of 2,000 feet asl it crosses the ELGYN fix.

ANALYSIS:

The pilot received the ATIS information which specified the IFR approach was the NDB to runway 21. The pilot set the aircraft navigational aids for that approach and prepared himself to execute that approach. When the air traffic controller asked the pilot which approach he would rather fly, the pilot chose the localizer approach to runway 15, a more accurate approach with lower minimums. In retrospect, the pilot questioned why they would change the approach on him when he was so close to the airport.

Normally, this change of approaches would not pose a problem, except that, after listening to ATIS, the pilot had prepared himself in his mind for the NDB approach and had not considered the localizer approach. While the pilot was being vectored for the localizer approach to runway 15, he was also getting out and analysing the approach plates, descending, slowing the aircraft, and lowering the flaps and gear. Because of the speed of the Baron aircraft, the pilot was rushed. He incorrectly set his number one VOR OBS to the 079 degree radial of the Kleinburg VOR instead of the 075 degree radial. This was to identify the intermediate fix on the approach. After passing this point, he probably intended to reset the VOR receiver to the 104 degree radial to identify the ELGYN fix. When asked by the Buttonville controller if he was past the ELGYN fix, the pilot incorrectly reported that he was. This report was based on the CDI needle of the incorrectly set OBS. The DME remained set to the Kleinburg VOR which he had been navigating to while en route.

Thinking that he had crossed the ELGYN fix, the pilot would have been descending to 1,300 feet asl. However, since the aircraft was off course to the right, the pilot was likely concentrating on returning to the localizer, not aware that he had descended below the MDA. Had the pilot been descending over a populated area rather than an empty golf course, lights on the ground might have provided an extra warning that he had descended too close to the ground. Over the golf course, there were no lights and the pilot struck the trees completely unaware.

The relatively late change in the type of approach to be flown coupled with the pilot's limited IFR experience taxed the pilot beyond his abilities on this night IFR approach.

CONCLUSIONS:

Findings:

1. The pilot was properly licensed for the flight.

2. The aircraft was properly equipped for the flight and had been maintained in accordance with existing regulations.

3. The pilot was unsure of his position on the localizer approach to runway 15.

4. The pilot descended below the minimum descent altitude for the approach.

Causes:

The pilot was unsure of his position on the approach and was unaware that he had descended too low for the approach until the aircraft struck the trees.

CESSNA 177B CARDINAL C-FIGT
ACME, ALBERTA 8 mi W
11 FEBRUARY 1989

BRIEF NUMBER: 89-W0033 (Accident)
LOCAL TIME: 1325 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	150	120
LAST 90 DAYS	10	10

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was operating out of his farm strip on a local recreational flight. The strip had slippery patches on hard-packed snow, and there was a light 90-degree cross-wind of about five knots. On the landing roll, the aircraft drifted to the side of the runway in spite of hard braking and ran into hard crusted snow. The nose gear failed, and the aircraft nosed down off the side of the strip.

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CESSNA 180 SKYWAGON C-FHUS
CRANBERRY-PORTAGE, MANITOBA 3 mi SE
27 FEBRUARY 1989

BRIEF NUMBER: 89-C0042 (Accident)
LOCAL TIME: 1610 CST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	455	175
LAST 90 DAYS	12	12

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

Because he encountered snow showers, deteriorating visibility, and gusty winds, the pilot of the ski-equipped aircraft decided to land on a lake short of his destination. As he flared into a whiteout condition and touched down, the right ski dug into the snow. The aircraft was substantially damaged before coming to rest.

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PIPER PA-22-108 COLT C-FNFQ
BANCROFT AIRPORT, ONTARIO
11 MARCH 1989

REPORT NUMBER: 89-O/0119 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1835 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	265	211
LAST 90 DAYS	21	21

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot took off from Oshawa, Ontario on a visual flight rules flight to Bancroft, Ontario. At 1827 eastern standard time (EST), the pilot joined the circuit on the downwind leg to runway 30. He visually inspected the snow-covered gravel runway on final approach and identified a black line as being the runway centre line. The pilot made a soft-field landing, and, on touchdown, the aircraft decelerated rapidly. The nosewheel collapsed, the left wing tip struck the runway, and the aircraft nosed over.

Before the flight, the pilot spoke to a local resident about current weather conditions; however, he was unable to contact the airport operator to determine the runway condition. The weather was broken cloud based at 8,000 feet above ground, and visibility 10 miles; the surface wind was calm, and the temperature was minus two degrees Celsius. During the day, approximately four inches of fresh snow had fallen and was melting. Sunset was estimated to be at 1820 EST; twilight conditions existed at the time of the occurrence.

The airport is operated by a local flying club and is certified for private use during daylight hours. It is situated in a river valley, and high terrain obstructs the view of the threshold during the downwind and base legs. Snow removal was handled by a municipal road grader and was ploughed to a height of three feet along the runway edges. The runway edge markers were obscured by snow, and the pilot had difficulty distinguishing the run-

way environment. In addition, daytime heating had melted and exposed dark gravel that had been pushed to the top of the right-hand embankment by the plough. Thinking that the gravel was the runway centre line, the pilot landed the aircraft with the right main landing gear and nosewheel on the snow embankment.

Given the recent snowfall, obscured runway markers, terrain, and twilight conditions, the pilot was not able to adequately examine the runway environment from the downwind, base, or final legs.

CONCLUSIONS:

Findings:
1. The pilot misidentified the runway centre line.

2. Runway edge markers were obscured by previously ploughed snow and a recent snowfall.

3. The pilot landed the aircraft on the snow embankment.

Causes:
The pilot misidentified the runway location.

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ERCO ERCOUPE 415C C-GFTB
KAKUT LAKE, ALBERTA
19 MARCH 1989

REPORT NUMBER: 89-W0060 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1542 MST
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	510	41
LAST 90 DAYS	14	14

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	–	–	–

HISTORY OF THE FLIGHT:

The pilot took off from his farm strip during the early afternoon to complete a local recreational flight. Approximately two hours later, the aircraft was observed manoeuvring back and forth with pronounced attitude changes at 300 to 400 feet above ground level (agl) two miles west of Kakut Lake. At one point, the aircraft pulled up into a steep climb, banked past vertical, dived, and recovered only a few hundred feet above the ground. The aircraft then climbed and headed east to Kakut Lake.

Minutes later, several snowmobilers, who were in a cookhouse at the south end of Kakut Lake, heard the aircraft approach from the north. As the group moved out of the shelter and into the yard, the aircraft entered a steep right turn and circled once at 200 to 300 feet agl. The bystanders waved, and the pilot, who was close enough to be recognized in the cockpit, rocked the wings in response. After heading east along the lakeshore for several seconds, the aircraft suddenly pitched up to a near vertical attitude, climbed about 150 feet, and entered a steep left turn. The angle of bank reached 120 degrees at the top of the manoeuvre, and the nose dropped straight down. The aircraft descended almost vertically and struck the ice on a southerly heading, approximately 400 feet north of the south shore of the lake. The pilot sustained fatal injuries and was thrown clear of the aircraft on impact.

PERTINENT INFORMATION:

Twenty minutes after the accident, the weather at Grande Prairie, Alberta, which is located approximately 30 miles southwest of Kakut Lake, was reported as 30,000 feet thin scattered, visibility 25 miles, temperature minus eight degrees Celsius, dew point minus 14 degrees Celsius, and winds from 060 degrees true at five knots. Witnesses to the accident reported the sky to be almost clear and the winds to be from the northeast at about four miles per hour.

The aircraft initially struck the snow-covered ice surface in a nose-down attitude, with the left wing slightly low at an impact angle of about 60 degrees. It skipped, brushed the snow lightly, and then came to rest upright 47 feet further on. An examination of the airspeed indicator determined that the airspeed on the initial impact was 90 to 110 miles per hour. During the cockpit examination, it was noted that the rod portion of the throttle control was exposed and bent at a point 2 1/2 inches forward of the throttle knob, indicating the throttle was partially closed at impact.

The pilot was thrown clear of the aircraft at some point between the second and the third impact. Pelvic injuries included a bruise on one hip and an abrasion on the other hip. The restraint system consisted of a lap strap with a cam-type fabric-to-metal buckle. Immediately after the accident, the seat-belt was noted to be unfastened, and it was recovered for laboratory analysis to determine if it was buckled properly during flight. A microscopic examination of the strap fibres revealed no evidence to indicate that the buckle squeezed the strap under high loading. This type of buckle is prone to

releasing at impact because the inertia of the trailing portion of the strap causes the strap to sling forward, releasing the buckle.

After an initial on-site examination, the wreckage was transported to the CASB shop in Edmonton. The aircraft flight control system was in the original Ercoupe configuration with the rudder control being coordinated mechanically through aileron input rather than through conventional rudder pedals. The cabin area of the aircraft was destroyed at impact, and several components in the flight control system were fractured. A visual examination of the fracture surfaces determined all fractures to be overload in nature and to be a result of the severe impact. The push rod to the right aileron bellcrank had fractured in an area where the wall thickness of the steel tubing had been reduced because of internal corrosion. The pushrod was forwarded by the CASB Engineering Laboratory for analysis.

The engine was disassembled, and, although no pre-impact discrepancies were identified that would have resulted in a sudden complete power loss, it was determined that the internal condition of the engine was not airworthy. The cylinders all displayed pitting corrosion on the bores, and the connecting rod bearings and crankshaft main bearings were severely worn. The number three connecting rod bearing had turned, the lead alloy bearing surface was worn completely away, and the copper liner was flaked to the point that the steel shell was exposed.

A review of the technical log books indicated that the engine had not had a major overhaul since installation in the aircraft in 1946. The incorrect engine time was carried forward to the Canadian engine log when the aircraft was imported to Canada in 1976, thereby, reducing the recorded time on the engine by 800 hours. The aircraft was not flown between July 1984 and September 1988, when the Certificate of Airworthiness was reinstated. The instructions contained in Continental Service Bulletin, M84-10 Rev. 1, which recommends the procedure to be followed to lessen the possibility of corrosion in engines used infrequently, had not been followed during the period of inactivity.

The nose gear and propeller had been damaged in an unreported landing accident approximately five months earlier, and the pilot, who was not a licensed aircraft maintenance engineer (AME), completed the repair work himself. The work had not been certified by an AME as required by regulation. An unapproved, hand-fabricated air filter had been installed on the aircraft, and the registration marks were not in place. The required documents were not on board the aircraft at the time of the accident. Fuel samples examined at the site were similar in colour and odour to purple farm fuel.

The pilot was enthusiastic about his Ercoupe and frequently related that it was very easy to fly. Much of his experience had been acquired on a Beechcraft Bonanza which comparatively was a much higher performance aircraft. He was confident in his flying abilities, and, although he had not received any formal aerobatic training and the Ercoupe was not designed for aerobatic flight, the pilot was known to practise basic aerobatic manoeuvres. He was mechanically inclined and liked working on his aircraft as much as he enjoyed flying. He had recently considered equipping the aircraft with spray gear and appeared to be fascinated with the idea of spraying.

The ELT did not transmit at impact. An examination of the unit determined that the selector switch was in the OFF position. The ELT transmitted when selected to the ARMED position, indicating that the G-switch had activated at impact.

The Air Regulations define "aerobatic flight" as "manoeuvres intentionally performed by an aircraft, involving an abrupt change in its attitude, an abnormal attitude, or an abnormal variation in speed."

ANALYSIS:

The pilot's previous experience in a higher performance single-engined aircraft may have induced a casual attitude toward flying the slower and simpler Ercoupe. His interest in eventually using the aircraft for spraying may have motivated him to over-demonstrate the aircraft at low altitudes. The altitude at which he initiated the wing-over type manoeuvre left no margin for error in judgement or performance, and the aircraft struck the ground during the recovery phase. The position of the throttle control suggested that the pilot, in an attempt to control rpm or to reduce vertical speed, reduced power as the aircraft began to accelerate during the recovery. This would have reduced the slipstream effect over the elevator, reduced the elevator effectiveness, and may have increased the amount of altitude required to recover. Safe operation of an aircraft requires that the pilot know the limits of his aircraft and operate within them, allowing reasonable margin for unforeseen circumstances.

Given the nature of the impact, the abdominal injuries to the pilot, and the history of this type of belt, it is probable that the trailing portion of the strap flung forward at impact and released the buckle.

The general condition of the aircraft, although not a factor in the accident, indicated that it had not recently been maintained in accordance with Transport Canada requirements.

CONCLUSIONS:

Findings:
1. The ELT was selected off and did not transmit at impact.

2. The pilot had received no formal aerobatic training.

3. The aircraft was not approved for aerobatic manoeuvres.

4. The required documents were not on board the aircraft.

5. The required registration markings were not displayed on the aircraft.

6. The pilot completed repairs to the aircraft subsequent to an unreported accident five months earlier. He was not a qualified AME, and he did not have an AME certify the work that was completed.

7. It is probable that the metal-to-fabric buckle on the pilot's seat-belt released on impact.

8. No pre-impact discrepancies that would have accounted for a sudden complete power loss were identified.

9. The internal condition of the engine was determined to be not airworthy.

10. No pre-impact airframe discrepancies that would have contributed to the accident were identified.

11. The pilot did not allow sufficient altitude to effect a safe recovery from a wing-over type manoeuvre.

Causes:
The pilot initiated a wing-over type manoeuvre at too low an altitude to effect a safe recovery.

BEECHCRAFT B58 BARON C-FSON
CHIPEWYAN LAKE, ALBERTA
21 MARCH 1989

REPORT NUMBER: 89-W0062 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1640 MST
OPERATION: Private Business
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,700	500
LAST 90 DAYS	35	23

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	2

SUMMARY REPORT:

During the take-off roll from the snow-covered runway, the aircraft began to swerve left, and, shortly after becoming airborne, it struck a snowbank along the side of the runway. The main landing gear was torn off, and the nose gear collapsed as the aircraft spun around and slid to a stop in deep snow.

The aircraft had been slow to accelerate during the take-off roll, and, because it was pulling left, the pilot diagnosed the problem as a loss of left engine power. He did not abort the take-off, but, instead, he attempted to get the aircraft airborne at a low airspeed. The aircraft did not climb above a few feet and then settled back to the ground several times before striking the snowbank, in a nose-high attitude.

The runway was covered with about three inches of crusty snow on a packed base, and the centre 15 or 20 feet were packed from aircraft operations. By following the tire tracks back from the accident site, it was apparent that left main landing gear was breaking trail on the crusty snow near the beginning of the take-off run while the nose and right gear ran on the packed area.

Both engines were examined and tested. They started without difficulty and were ground run at take-off power. No discrepancy was found.

The pilot erroneously attributed the poor acceleration and left yaw to the loss of left engine power. These symptoms were caused by asymmetric drag created by the left wheel operating in the crusty snow, while the remaining wheels rolled freely on the packed snow. When directional control was not maintained, the pilot should have aborted the take-off instead of attempting to lift off with insufficient airspeed.

CONCLUSIONS:

Findings:
1. The aircraft was slow to accelerate and yawed left during take-off because of asymmetric drag caused by the left wheel rolling on crusty snow.

2. The pilot attempted to lift off without sufficient airspeed even though directional control was lost.

3. Both engines were operating normally.

Causes:
The pilot did not abort the take-off when directional control was lost.

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STINSON 108 VOYAGER C-FRJQ
KAMLOOPS, BRITISH COLUMBIA 10 mi SW
25 MARCH 1989

REPORT NUMBER: 89-P0074 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1653 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	350	200
LAST 90 DAYS	200	15

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	1	–

SUMMARY REPORT:

The pilot, who was on a visual flight rules flight to Walloper Lake, landed the wheel-equipped aircraft in Kamloops, British Columbia for fuel. Finding that the fuel pumps had been closed for the day, and following an unsuccessful attempt to contact the refueller, the pilot elected to continue the flight to destination, 14 miles to the southwest. Prior to departure, he visually inspected the aircraft fuel tanks and estimated that there was adequate fuel for the flight. Following take-off, the pilot positioned the fuel selector from both fuel tanks to the right tank only. The engine then stopped. The pilot reselected both tanks and switched on the boost pump. The engine surged and then stopped, and the pilot carried out a forced landing in a treed area. Both occupants were seriously injured.

The pilot was flying a Stinson Voyager aircraft which had been modified to accept a fuel-injected Continental IO-360 engine. Before take-off, the fuel gauge had indicated about one-quarter full for both the right and left tank. When the pilot visually inspected the tanks prior to departure, he had estimated that they contained a total of about eight gallons of fuel. Predicated on a fuel consumption of seven gallons per hour, he believed that the flight endurance remaining was approximately one hour, enough for the proposed 15-minute flight with the required 45-minute reserve.

The investigation identified no pre-impact mechanical deficiency with the aircraft. The fuel system showed no evidence of leaking, and the engine fuel distributor was dry. There was a total of 1.3 gallons and 1.05 gallons of fuel remaining in the left and right tanks respectively. The unusable fuel per tank is about two gallons. Neither tank had been ruptured by the crash impact, and there was no evidence of fuel having spilled at the accident site.

The pilot did not advise either the tower controller or the flight service station (FSS) specialist regarding his fuel requirement. Either of these facilities could have informed the refueller of the requirement during off-duty hours.

The Stinson Voyager is a tail-wheel-configured aircraft, and, when the aircraft is stationary, the wing tanks are tilted aft. Thus, when the pilot visually inspected the tanks prior to take-off, it would have been difficult to estimate accurately the quantity of fuel remaining in the aft portion of each tank. The fuel quantity indication system in the Stinson aircraft is not accurate, particularly when measuring low quantities of fuel with the aircraft in a stationary position.

The investigation concluded that the pilot misjudged the fuel quantity remaining when he visually inspected the tanks and, thus, departed with insufficient fuel to complete the flight. The engine stopped because of fuel exhaustion.

CONCLUSIONS:

Findings:
1. The pilot misjudged the fuel quantity remaining when he visually inspected the tanks.

2. The flight was undertaken with insufficient fuel to complete the flight.

Causes:
The pilot undertook a short flight without ensuring that there was sufficient fuel on board to complete the flight safely.

PIPER (SMITH) PA-60-601A AEROSTAR C-FBBA
OSHAWA MUNICIPAL AIRPORT, ONTARIO
05 APRIL 1989

BRIEF NUMBER: 89-O/0149 (Accident)
LOCAL TIME: 1320 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	860	125
LAST 90 DAYS	15	4

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

After a simulated instrument flight rules practice flight, the pilot and passenger landed on runway 22 at Oshawa, Ontario. During the landing roll, the pilot intended to raise the flaps; however, he inadvertently selected the landing gear up. The nosewheel slowly collapsed, the right engine propeller tips struck the runway, and the aircraft skidded to a stop.

PIPER J3C-65 CUB C-FUNQ
VANDERHOOF AIRPORT, BRITISH COLUMBIA
10 APRIL 1989

BRIEF NUMBER: 89-P0084 (Accident)
LOCAL TIME: 1140 PDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	92	54
LAST 90 DAYS	19	18

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The student pilot was flying her private pilot flight test with a flight examiner. During a simulated soft-field landing on the paved runway, the aircraft veered to the left. The pilot applied full right rudder; however, the aircraft continued toward the left edge of the runway where it ran into a snowbank.

The wind was calm at the time of the occurrence and the sky was clear. Neither occupant was injured; the aircraft was substantially damaged.

MOONEY M20C RANGER C-GEZM
STONEWALL, MANITOBA 5 mi N
15 APRIL 1989

BRIEF NUMBER: 89-C0067 (Accident)
LOCAL TIME: 1120 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	550	350
LAST 90 DAYS	1	1

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot, realizing that he had landed downwind, decided to overshoot. Carburettor heat was still selected on, and the aircraft failed to climb. The pilot reduced the power, and the aircraft landed hard. The right main gear collapsed, and, as the aircraft came to a stop, the nosewheel also collapsed.

CESSNA 180 SKYWAGON CF-WYS
MORDEN, MANITOBA
17 APRIL 1989

BRIEF NUMBER: 89-C0070 (Accident)
LOCAL TIME: 1830 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	900	150
LAST 90 DAYS	10	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

REPORTED CIRCUMSTANCES:

During the landing roll, the aircraft began to drift to the right, and the pilot was unable to regain control. The left wing rose, and the aircraft nosed down. There was a 15 to 25 mph cross-wind from the left.

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CESSNA 180G C-FPGZ
VANDERHOOF, BRITISH COLUMBIA
30 APRIL 1989

BRIEF NUMBER: 89-P0101 (Accident)
LOCAL TIME: 1400 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	265	265
LAST 90 DAYS	24	24

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The pilot of the Cessna 180 was unable to determine the extent of water and mud contamination on the grass strip that would have permitted an into-wind landing, so he elected to land in a strong cross-wind on the airport's asphalt runway. The aircraft was at slow speed during the landing roll when a wind gust from the left caused the right wing to drop and contact the ground. The pilot overcorrected with left aileron, and the left wing tip also struck the runway. The aircraft then pitched nose-down, and, despite full aft control input, the propeller struck the ground.

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CESSNA 150K CF-TPM
PETERBOROUGH AIRPORT,
ONTARIO 5 mi E
04 MAY 1989

REPORT NUMBER: 89-O/0191 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1020 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	611	20
LAST 90 DAYS	35	3

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

SUMMARY REPORT:

The pilot and passenger were on a cross-country flight from St. Hubert, Québec to Chatham, Ontario and had planned a stopover in Peterborough, Ontario for refuelling. As the aircraft was approaching Peterborough Airport, the engine (Continental 0-200-A) stopped, and the pilot decided to carry out a forced landing. During the landing, the aircraft struck a stone and wood rail fence with the main landing gear and came to rest in an inverted position.

The aircraft departed St. Hubert, Québec with an estimated fuel load of 120 pounds or about three quarters of a tank showing on the fuel gauges. The flight was conducted at a cruise altitude of 2,500 feet and a cruise power setting of 2,400 rpm. The fuel mixture control was selected to full rich for the duration of the cross-country trip. The pilot reported that the upper winds had a stronger head wind component than for what he had flight planned. When he overflew the Stirling very high frequency omnidirectional range (VOR), 29 miles north-east of Peterborough, he glanced at the fuel gauges which were indicating one-quarter tank remaining and elected to continue the flight to Peterborough for refuelling. Approximately five miles east of Peterborough Airport, the engine stopped, and the pilot force-landed the aircraft. Subsequent examination revealed that the main fuel and primer lines were empty of fuel.

Using the estimated wind, the power settings, and the route taken for this flight, it was calculated that the total fuel consumption was at least 108 pounds. The total unusable fuel in this aircraft is three and one-half U.S. gallons or 21 pounds. The combination of these two weights represents a total fuel weight of 117 pounds. The pilot stated that he had approximately 120 pounds of fuel on board prior to departure. The fuel gauge indications of one-quarter tank over the Stirling VOR were inaccurate. A quick fuel calculation would have determined that the pilot was pushing the aircraft's endurance to the limits and not allowing for the required 45-minute fuel reserve. The lack of fuel remaining in the main fuel and primer lines showed the engine stopped due to fuel exhaustion.

CONCLUSIONS:

Findings:

1. The engine stopped because of fuel exhaustion.

2. The pilot did not give consideration to the required 45-minute fuel reserve.

Causes:

The pilot did not ensure there was adequate fuel on board to complete the flight.

BEECHCRAFT N-35 BONANZA CF-DCM
PETERBOROUGH AIRPORT,
ONTARIO 1/2 mi SW
20 MAY 1989

REPORT NUMBER: 89-O/0217 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1820 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,500	250
LAST 90 DAYS	20	20

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	2

SUMMARY REPORT:

The aircraft with the pilot and two passengers took off from the Peterborough Airport to St. Catharines, Ontario. After lift-off, the pilot adjusted for heading and switched on the autopilot. The pitch knob was then set for a gentle climb and the pitch switch was selected on. Immediately after the switch was selected, the aircraft pitched violently nose-down. The control column went fully forward, and the pilot pulled back trying to override the autopilot. A loud bang was heard, and the column became easier to move. However, when this occurred the pilot, who was exerting a large amount of backward pressure on the column, snapped back and hit the back of the seat with sufficient force that it failed. The pilot eventually regained control of the aircraft and decided to carry out a forced landing in a field. During the landing roll, the aircraft went through two wooden fences before coming to rest.

To engage the autopilot pitch mode, the aircraft should be trimmed to manually centre the needle on the pitch servo indicator. The autopilot pitch will then match the attitude being flown and will allow a smooth transition from hand flight. The autopilot can be disengaged five different ways: the pilot can use the release switch and/or the breakaway clutch (for pitch control) on the control wheel; on the autopilot control panel, the pilot can use the autopilot master switch or pull the autopilot circuit breaker; and, finally, as a last resort, the aircraft master switch will remove power to the autopilot.

The flight controls were checked at the site and found to be functioning normally. The autopilot control, amplifier, and artificial horizon, all integral parts of the autopilot, were removed and checked at an avionics facility. Examination revealed that the contacts on the amplifier were oxidizing, resulting in poor contact and signal transmittal. Although the abnormal pitch inputs could not be duplicated on the test stand, it was determined that even the removal of the plug from the amplifier was sufficient to clear the contact surface and allow the autopilot to function normally for an undetermined amount of time.

The autopilot incorporates a breakaway clutch mechanism where, if the system acts abnormally, the pilot has the option of overriding and overpowering the autopilot by applying a force of 40 pounds on the control column. The clutch mechanism splits and completely disconnects the autopilot from controlling the aircraft pitch attitude.

The seat-locking mechanism was examined. The locking pin that holds the seat in the upright position failed in overload. The locking pin did not appear to be a manufacturer's original part, but a repaired unit, as evidenced by the unpainted weld surrounding the pin. Whether the manufacturer's original part would have been able to better withstand the amount of force that was exerted by the pilot during the recovery attempt is not known. The repair was not recent. The pilot had owned this aircraft for approximately one and a half

years and did not recall having the repair done during this time period.

When the pilot pulled back on the control column, the breakaway clutch released the autopilot from controlling the aircraft and allowed the pilot to regain control. The field that was chosen for the forced landing was bordered by wooden fences and was not long enough to bring the aircraft to a safe stop.

CONCLUSIONS:

Findings:
1. When pitch control was selected with the autopilot on, the aircraft pitched nose-down.

2. Examination of the autopilot determined that an oxidized connection in the amplifier was interfering with signal transmittal to the remaining autopilot system.

3. The pilot overpowered the autopilot and decided to carry out a forced landing in a field.

4. The seat back failed in overload and contributed to the control difficulties.

5. The field was short and the aircraft struck two bordering fences.

Causes:
Control difficulties after the pitch control on the autopilot was selected on influenced the pilot to carry out a forced landing in an unsuitable field.

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PEZETEL WILGA 80 C-GCIN
SHELBURNE, ONTARIO
22 MAY 1989

REPORT NUMBER: 89-O/0220 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1245 EDT
OPERATION: Specialty Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	900	400
LAST 90 DAYS	13	13

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The pilot and passenger were taking off from a grass strip with a glider in tow. During the take-off, the towplane went off the left side of the runway, struck a ditch, and came to rest in an inverted position. The glider returned to the runway for landing.

The towplane and glider were taking off on runway 26, a 4,000-foot grass strip, which was extremely spongy. The aircraft commenced the take-off from an intersection which gave them a take-off distance of about 3,000 feet. The runway has an upslope to the mid point from where the take-off commenced. The towplane was 97 pounds less than the maximum allowable take-off weight of 2,866 pounds. The wind was reported to be 320 degrees magnetic at about 10 knots. This was the first flight at this airstrip for the towplane and pilot; however, glider operations had been conducted that morning and the previous three days.

During the take-off run, the towplane did not maintain the centre of the runway but rather proceeded gradually to the left until it struck the ditch. The towplane pilot stated that he attempted to lift off three times after reaching take-off speed and that he pulled the power off when he realized the aircraft was not going to get airborne. At this time, the glider pilot selected disconnect and performed a climbing right turn and landed in the direction opposite to take-off. Both pilots of the glider reported that they maintained an altitude low to the ground and a position behind the towplane.

The combination of a high all-up weight, the runway surface conditions, the runway upslope, the cross-wind, and the glider in tow impeded the performance of the towplane. The most significant of these factors was the 60-degree cross-wind at about 10 knots which directly influenced the take-off path during the ground run. The position of the glider during the tow operation was correct and, therefore, did not contribute to the loss of directional control during the take-off. It could not be determined why the towplane failed to become airborne after reaching take-off speed.

CONCLUSIONS:

Findings:
1. This was the first flight at this airstrip for the towplane and pilot.

2. The towplane did not maintain the centre of the runway during the take-off run.

3. The glider maintained a proper position behind the towplane during the take-off run.

4. It could not be determined why the towplane failed to become airborne after reaching take-off speed.

Causes:
Directional control was not maintained during the take-off run, and the towplane left the confines of the grass runway.

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PIPER PA-22 TRIPACER C-GABZ
WABUSH, NEWFOUNDLAND
30 MAY 1989

REPORT NUMBER: 89-A0119 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1840 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	500	100
LAST 90 DAYS	2	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

SUMMARY REPORT:

The PA-22 pilot was taxiing across the ramp at Wabush to begin a recreational flight to Churchill Falls, Newfoundland. While on the ramp, the pilot taxied behind a Lockheed 188, Electra. The prop-wash from the Electra blew the PA-22 onto its right wing and propeller, causing substantial damage.

The Electra was parked at a passenger gate with its tail pointed out over the ramp. There was room to park the Electra on the other side of the ramp; however, a mechanic was test-running the engines with the aircraft at the gate. The mechanic did not advise the flight service station (FSS) specialist that he was going to run up the engine. The Electra's engines were producing about 1000 horsepower when the PA-22 taxied into the prop-wash approximately 60 feet behind the Electra.

The PA-22 pilot had turned on his radio but had not contacted Wabush (FSS). The ramp at Wabush is uncontrolled, and there was no requirement for the PA-22 pilot to make radio contact before taxiing. The PA-22 pilot saw the Electra and realized before he taxied behind the Electra that it was running. He had an alternate route available to reach the runway which would have avoided taxiing behind the Electra.

AIP Canada (AIR 1.6, 1.7), explains the hazard to light aircraft when taxiing behind large aircraft which have their engines running, even at idle. The publication makes particular note of the increased hazard to high wing, narrow undercarriage aircraft. The PA-22 fits this category of aircraft.

The FSS specialist attempted to contact both the PA-22 and the Electra to warn them of the developing situation, but he was unsuccessful. In his attempt to contact the PA-22, the specialist used the call sign Alpha Zulu instead of the correct Alpha Bravo Zulu.

CONCLUSIONS:

Findings:
1. The prop-wash from the Lockheed Electra blew the PA-22 onto its wing and propeller, causing substantial damage.

2. A mechanic was test-running the Electra's engines at a gate position, with the prop-wash blowing over the ramp.

3. The Electra mechanic did not advise Wabush FSS of his intentions to do a run-up.

4. The PA-22 pilot was aware that the Electra's engines were running before he taxied behind it.

5. Neither aircraft operator contacted Wabush FSS to state their intentions.

Causes:
The Electra's flight engineer conducted an engine run and run-up in a position which was hazardous to other aircraft on the ramp. The PA-22 pilot taxied behind the Electra even though he knew the Electra's engines were running.

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TAYLORCRAFT BC12D CF-NKF
ARBORFIELD, SASKATCHEWAN
01 JUNE 1989

REPORT NUMBER: 89-C0093 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1705 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	2,500	2,000
LAST 90 DAYS	15	15

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	1	-
PASSENGERS	-	-	-

SUMMARY REPORT:

The pilot departed the Arborfield, Saskatchewan airport for a return visual flight rules (VFR) flight to his private farm strip 15 miles northeast of the community. After very little ground roll, the aircraft became airborne in an exaggerated nose-high attitude. The aircraft climbed to an estimated height of 100 feet above ground level (agl) and did a series of nose-high turns. The aircraft then entered a descending left turn and crashed 600 feet off the north end of the airport. The pilot received serious injuries in the accident. The aircraft was not equipped with an emergency locator transmitter (ELT) or a shoulder harness.

The left wing struck the ground first, and the aircraft pitched nose-down. It then rotated rearward on its main wheels and came to rest in a 60-degree nose-down attitude in line with the runway.

The pilot had landed at the Arborfield Airport at about 1200 central standard time (CST) on the day of the occurrence. During the landing, directional control was lost, and the aircraft veered off the runway to the left and contacted the support structure of a hangar with the left wing. The impact was severe enough to compress a 12-inch area at the midpoint of the left wing, from the leading edge back to the main spar. The wing was displaced half an inch at the root by the force of the impact. The pilot left the aircraft parked against the hangar and walked to town to conduct his business. When he returned, the owner of the hangar had pushed the aircraft away from the hangar and advised the pilot not to fly the aircraft in its present state. The pilot checked the damaged area and, without further pre-flight inspection, started the engine by hand and took off.

The aircraft records were examined, and it was found that the Certificate of Airworthiness (C of A) had expired 16 years prior to the accident.

Examination of the aircraft after the take-off occurrence revealed that the elevator trim tab was in the full nose-up position and the indicator was in the nose-down position. The elevator trim cable was found off the forward drive pulley, and the right mechanical brake cable was found disconnected at the heel brake pedal. The engine was producing high power at impact.

The forward elevator trim drive pulley did not have provision for a cable guard to be installed which would have prevented the cable from coming off the pulley. The system relied solely on tension to prevent the cable from coming out of the deep V-groove pulley. The magnitude of the cable tension prior to the accident is not known. It is most probable that the trim cable came off the pulley when the aircraft was trimmed for the previous landing.

On landing at Arborfield, the pilot lost directional control when he applied the brakes and only the left brake responded. This caused the aircraft to veer to the left and strike the hangar, damaging the left wing. During the take-off occurrence, the pilot was unable to overcome the up-elevator force and lower the nose to prevent the aircraft from stalling. When he attempted to trim the aircraft nose down, there was no response.

CONCLUSIONS:

Findings:
1. The left wing and leading edge were damaged during the landing roll of the previous flight.

2. The elevator trim tab was in the full nose-up position.

3. The elevator trim cable was off the forward drive pulley. It is probable that this condition existed prior to the occurrence flight.

4. The right mechanical brake cable was disconnected.

5. The C of A had expired 16 years prior to the accident.

6. The aircraft was not equipped with an ELT.

7. The pilot was unable to overcome the up-elevator force and lower the nose of the aircraft, and the aircraft stalled.

Causes:
The accident resulted from a combination of inadequate maintenance, insufficient pre-flight inspection, and poor

judgement by the pilot in attempting flight with a damaged and unserviceable aircraft.

PIPER PAWNEE PA-25-235 C-GODH
EFFINGHAM, ONTARIO
02 JUNE 1989

REPORT NUMBER: 89-O/0248 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2104 EDT
OPERATION: Aerial Application and Distribution
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	4,000	2,000
LAST 90 DAYS	15	13

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

SUMMARY REPORT:

The pilot was spraying non-toxic liquid for the local Conservation Authority. During the spray operation, the aircraft struck hydro wires and crashed.

This was the initial spray swath of this particular area. Previous to this run, the pilot had sprayed an area approximately 300 yards north of the accident site. The pilot did not check the grounds for obstructions but proceeded immediately to spray the designated block. While spraying, the pilot looked at the boom to confirm activation and then looked at another spray area he was to spray, approximately 300 feet west of his position. The pilot's attention returned to the spray boom, and, as he initiated his pull-up procedure, he noticed hydro wires directly ahead.

There were three separate strands of hydro wires which were parallel to each other and ran in an east/west direction. These wires were directly north of the spray area, and there was rising terrain in the background when approached from the south. The aircraft struck the first two strands of wires and crashed beneath the third strand.

Time of official dark for this area was 2115 EDT. The accident occurred 11 minutes prior to this. The pilot reported that his visibility was slightly restricted and he did not see the wires until just before the aircraft struck them.

The hydro wires blended into the rising terrain background and could, therefore, not be easily seen. The low level of ambient light contributed to the camouflage effect that the background terrain had on the hydro wires.

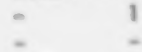
CONCLUSIONS:

Findings:
1. The spray area had not been checked by the pilot for obstructions prior to spraying.

2. The pilot did not see the hydro wires until just before the aircraft struck them.

3. The accident occurred 11 minutes before official dark.

Causes:
The pilot commenced spraying the area in poor light conditions and without a prior check for hazards.



CESSNA 172 CF-LAY
SAVARY ISLAND, BRITISH COLUMBIA
04 JUNE 1989

REPORT NUMBER: 89-P0137 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1345 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	500	450
LAST 90 DAYS	25	25

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

SUMMARY REPORT:

The pilot was making his first landing at Savary Island, and because the approach to runway 27 was clear of trees, decided to use that runway. Both sides of the runway and the approach to runway 09 were surrounded by tall trees that constricted both the available width of the strip and the overshoot area. To enhance both aircraft control and overshoot capability, the pilot decided to complete a low angle flaps up approach at a faster than normal airspeed and land on the button. As the aircraft passed over the end of the runway, the main landing gear caught the soft sand embankment extending up to

the runway threshold and pitched the aircraft forward onto the nose gear. The aircraft bounced, then landed in a nose-down attitude and slid to a stop with the nose gear and left main landing gear folded back. Both the pilot and the passenger escaped uninjured.

At the time of this occurrence the visibility was unlimited and there was a light wind from the east.

The Savary Island airstrip is 2,000 feet long, 30 feet wide and is surfaced with compacted sand and gravel. The approach to runway 27 is over a vegetation covered area that slopes up gently to the runway. Runway 27 was extended into the approach area until the threshold was approximately three feet above the approach area ground level. The sand, used to extend the runway, slopes up from the approach area to the runway surface at 45 degrees and has become evenly rounded onto the runway surface.

Relative size judgements, including height differentials, are based on many factors that include previous experience with similar objects and the shadows that are cast. If there are no shadows to indicate that a height difference exists between adjoining areas, the eye will perceive those areas as being at the same level.

When the aircraft was on final, the rounded runway threshold was evenly lit and there were no shadows to alert the pilot that the end of the runway was three feet higher than the approach area. The lack of shadows may have created the illusion that the runway surface and the approach area were at the same elevation, thereby likely contributing to the pilot's misjudgement of his height over the threshold. The flaps up approach produced a nose high attitude that restricted forward vision and made height judgements more difficult. Since the approach was flown at a low angle, the clearance between the aircraft's landing gear and the ground was reduced. This made accurate height judgements a necessity if the aircraft was to land on the runway threshold. The pilot's ability to assess his height above the threshold may have been adversely affected. He continued the approach until the main landing gear struck the raised runway edge.

CONCLUSIONS:

Findings:
1. The evenly rounded runway threshold was three feet higher than the approach area.

2. There were no shadows to assist in alerting the pilot that the runway was higher than the approach area.

3. The pilot misjudged his height above the threshold.

4. The pilot flew a flaps up approach at a low angle.

Causes:
The pilot misjudged his height above the threshold.

DE HAVILLAND DHC-3 OTTER N5323G GRENVILLE CHANNEL, BRITISH COLUMBIA 08 JUNE 1989

BRIEF NUMBER: 89-P0135 (Accident)
LOCAL TIME: 1655 PDT
OPERATION: Private Ferry
DAMAGE: Destroyed
PILOT LICENCE: Commercial (U.S.A.)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	19,600	2,000
LAST 90 DAYS	150	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

REPORTED CIRCUMSTANCES:

The wheel-equipped aircraft was being ferried from Seattle, Washington to Gustavus, Alaska. About three hours after departing Port Hardy, British Columbia and while cruising at 4,000 feet above sea level (asl) along the rugged coastline, the pilot heard a loud explosion and the engine suddenly lost power. The pilot looked for a suitable place to land; however, nothing was available on the rugged shoreline. The engine continued to lose power, so the pilot decided to ditch the aircraft in the Grenville Channel. About 10 minutes after the initial engine malfunction, the engine seized.

The pilot landed with full flap and into a 25-knot head wind. The aircraft touched down on the water with a ground speed of about 20 miles per hour. The aircraft remained upright, and the two occupants were able to don their life-jackets and swim to shore. The aircraft eventually sank.

The pilot suspected that the engine failure was caused by an engine cylinder malfunction.

CESSNA 310F C-FIBC
VALCOURT AIRPORT, QUÉBEC
16 JUNE 1989

REPORT NUMBER: 89-Q0156 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1950 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,000	2
LAST 90 DAYS	10	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

SUMMARY REPORT:

The pilot was on a recreational flight between Valcourt and Mascouche, Québec. Before landing in Mascouche, he checked that the green GEAR DOWN AND LOCKED indicator light was on. He also checked the mirror mounted on the outboard left-wing tank and saw that the left main gear was down, but could not determine the exact position of the right main gear. He made an approach to check the condition of the runway, then made another circuit and touched down with the left gear first. When he brought the right gear down on the runway, the pilot felt the aircraft sink. Realizing that the right wheel was not fully extended, he reapplied full power and took off. While in the circuit, the pilot fully retracted the landing gear without difficulty, then selected GEAR DOWN. He made two low-level passes and received confirmation that the right gear was only partially extended. He then retracted the landing gear and tried to extend it manually, but in vain. Having attempted all possible procedures, the pilot decided to return to Valcourt for a gears-up landing.

He contacted the Valcourt airport manager by radio and informed him of his plan. The airport manager explained that he would request that the runway be sprayed with foam. The pilot feathered the right propeller during the approach, then retracted the flaps and shut off the left engine just before the aircraft touched down on its belly near the runway threshold. The aircraft slid about 580 feet and came to rest in the grass a few feet from the left edge of the runway. The pilot was uninjured. Ground impact was not hard enough to activate the emergency locator transmitter (ELT).

When the aircraft was raised on jacks, it was confirmed that the right gear did not come out of its well completely , but the GEAR DOWN AND LOCKED indicator light came on. The inspection also revealed that the right gear extension linkage was bent; as a result, it was not long enough to allow the side brace link to lock.

The aircraft journey log and technical log book indicated that the aircraft had been certified in accordance with existing regulations. The inspection and the landing gear retraction tests revealed that the right gear swivel joints were partly seized due to inadequate lubrication; this prevented the gear extension mechanism from lowering the gear enough to allow the side brace link to lock. It was also determined that the right gear microswitch had been jammed in the GEAR DOWN AND LOCKED position.

At the last inspection of the aircraft, no major repairs to the landing gear retraction system were done. The landing gear check-list does not include a check of the microswitches. The licensed aircraft maintenance engineer stated that the landing gear had been lubricated. However, when the right gear was greased, it moved freely again.

The pilot had never flown this type of aircraft prior to the occurrence. He stated that the former owner had made the two flights required to revalidate the certificate of airworthiness. He also said that he requested an adjustment to the right propeller after his first flight because it was slow to react when he feathered it. He did not report any difficulty in extending the landing gear.

When the pilot obtained an indication of GEAR DOWN AND LOCKED during the landing at Mascouche, it is probable that the landing gear extension mechanism was already defective before take-off. The locking of the main landing gear side brace links is supposed to protect the retraction mechanism linkages from the stresses imposed during initial touchdown, which they cannot withstand. The partial seizure of the right landing gear due to inadequate lubrication prevented it from extending normally. The microswitch on the right gear was jammed in the GEAR DOWN AND LOCKED position, and it gave the maintenance personnel and pilots a false indication. The control linkage started to bend during the two test flights, but the pilot obtained an indication of GEAR DOWN AND LOCKED and was unaware of the defect. On initial touchdown at Mascouche, the linkage was bent to a point where the gear collapsed, and the pilot felt the aircraft sink. The pilot was forced to make a gears-up landing.

CONCLUSIONS:

Findings:
1. The GEAR DOWN AND LOCKED indicator light was on, but the right landing gear was only partially extended.

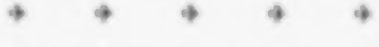
2. Inadequate lubrication led to the partial seizure of the right landing gear.

3. The right landing gear microswitch was jammed in the GEAR DOWN AND LOCKED position.

4. The right landing gear extension linkage was bent and was not long enough to allow the side brace link to lock.

5. The partial collapse of the right landing gear occurred on the first landing.

Causes:
The landing gear had not been properly maintained.



CESSNA 180B SKYWAGON N1895X
BEAVER CREEK, YUKON 36 mi S
17 JUNE 1989

BRIEF NUMBER: 89-W0120 (Accident)
LOCAL TIME: 1930 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A.)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	342	201
LAST 90 DAYS	23	23

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

REPORTED CIRCUMSTANCES:

The pilot was departing from the highway at the White River Lodge (Mile 1169) where he had landed earlier due to poor weather. During the take-off, the pilot was rounding a shallow curve, and, as the aircraft tail lifted, he observed a vehicle and driver in the middle of the highway. The vehicle was one of two being used to block traffic on each end of the take-off area. There was insufficient distance to stop so the pilot elected to lift off. The aircraft cleared the truck; however, with a variable cross-wind and low airspeed, the pilot lost control of the aircraft. The aircraft contacted willows along the highway and struck the ground. This type of aircraft is equipped with a conventional landing gear, and therefore forward visibility over the nose is limited when the aircraft is on the ground.

CESSNA 188 AGWAGON C-GMSL
ROSEDALE, ALBERTA 2 mi N
19 JUNE 1989

REPORT NUMBER: 89-W0122 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0630 MDT
OPERATION: Aerial Application
DAMAGE: Destroyed
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	800	40
LAST 90 DAYS	40	40

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	1	-
PASSENGERS	-	-	-

SUMMARY REPORT:

The pilot had completed approximately 15 spray runs across the field and was lining up for the last run before landing to reload. As the aircraft passed under power lines on the approach, the lower of three power cables broke the deflector wire on top of the aircraft and then struck the leading edge of the fin. The aircraft dived into the ground, nosed over, and began to burn. One of the flagmen ran to the aircraft and dragged the pilot clear before the aircraft was destroyed by fire.

During the spraying of this field, the pilot was intentionally flying under the power lines. The lowest power line was 21 feet above the road bordering the field; however, rolling terrain in the adjacent field reduced the clearance between the cable and the ground to only 13 feet on the final run. When the Agwagon is in the flying attitude, the top of the fin is 11 feet above the main wheels.

The three-quarter-inch diameter power cable consisted of a seven strand steel cable with two wrappings of aluminium, the tensile strength of which far exceeded the tensile strength of the one-eight-inch diameter deflector cable fitted to the aircraft.

The pilot was the owner of the field being sprayed, and he was aware of the power line and the rolling terrain in the next field. He had about three years experience in crop-spraying operations. With the exception of about 40 hours flown in the last three weeks, his crop-spraying

experience had taken place more than 20 years previously. The pilot had not taken any refresher training.

The pilot did not take sufficient precautions to ensure all obstructions were recognized and considered in planning for the spraying of the field.

CONCLUSIONS:

Findings:
1. A knoll on the approach to the field reduced the ground clearance below the power line to only 13 feet.

2. The height of the aircraft in the flying attitude is 11 feet.

3. The pilot was engaging in agricultural flying after an absence of over 20 years.

4. The pilot had not taken any refresher training in aerial crop spraying.

5. The tensile strength of the power cable exceeded that of the deflector cable fitted to the aircraft.

Causes:
The pilot did not take precautions to check the field for obstacles, perhaps due to the lack of recent experience in agricultural flying.

CESSNA T210M CENTURION N887MM
MONCTON, NEW BRUNSWICK
23 JUNE 1989

REPORT NUMBER: 89-A0145 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1319 ADT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,000	13
LAST 90 DAYS	N/A	13

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The aircraft was on the third leg of a planned ferry flight between Oklahoma City, Oklahoma and Dusseldorf, Republic of West Germany, with a planned stop at Moncton, New Brunswick. After take-off from Bangor, Maine, the electrically driven hydraulic pump ran continuously after the retraction cycle was completed. The pilot pulled the circuit breaker and tried to recycle the gear manually. Finding it did not work, he continued on to Moncton. On arrival, the pilot could only extend the nose gear and the left main gear. The right main gear remained in the wheel well. After consultation with Cessna and other technical people, the pilot still could not extend the right main gear. The pilot retracted the gear and made a wheels-up landing on the grass beside runway 29 at Moncton. The landing was successful, and the aircraft remained upright on its belly. The two occupants evacuated the aircraft without difficulty.

The new owners had purchased the aircraft at an Oklahoma City auction sale the week before the accident. They had arranged for an annual inspection for export, the equivalent of a 100-hour inspection, with an Oklahoma City mechanic. The inspection was completed using the appropriate Cessna Maintenance Manual check-list. As part of the inspection, a gear retraction test was conducted, and the mechanic inspected the wheel wells.

The aircraft was a 1978 Cessna Model 210 which incorporates mechanical uplock latches to hold the main gear in the up position. These latches are spring-loaded to the lock position and are hydraulically actuated to unlock them. The hydraulic actuator is joined to each of the latches by a series of control rods. The last control rod is a turn-buckle connected at the outboard end to each latch using a clevis pin. The clevis pin is secured in place with a cotter pin.

The right-hand clevis pin was missing, which destroyed the continuity of the hydraulic control rods, thus preventing the right-hand uplock from being released. The cotter pin was missing from the equivalent clevis pin on the left-hand side. This clevis pin had worked itself halfway out of the uplock latch. In addition, the lock nuts on the outboard end of each turn-buckle were loose.

The hydraulic system fluid reservoir was dry. Inspection revealed three fluid leaks: at a tee fitting on the left side of the hydraulic power pack; at a coupling on a line from the power pack; and in the nosewheel area. None of the leaks was free flowing, and the fluid had leaked over a considerable period, except for the power pack. Fresh fluid was evident on the bottom of the fuselage coming from this fitting. The fitting was removed and inspected and found to be serviceable. After the fitting was reinstalled, the leak disappeared.

The turn-buckle is part of the control rod system that allows adjustments to the up latches. When adjustments are required, the mechanic normally removes the cotter

pin from the end of both outboard clevis pins and loosens the lock nuts on both turn-buckles. This allows the mechanic to make several adjustment cycles without constantly redoing the safety devices. After the adjustments are completed, the mechanic secures the system by replacing the cotter pins and tightening the lock nuts.

The missing clevis pin on the right side, the missing cotter pin on the left side, and the loose lock nuts indicate of an incomplete adjustment cycle. At some time in the past, not necessarily during the last inspection, someone adjusted the landing gear uplocks. After the adjustments, the required safety procedures were not completed (cotter pins missing and lock nuts loose). The investigation could not determine who was responsible for the oversight or why the oversight occurred, nor could it be determined why the missing cotter pins were not detected on the last annual inspection.

The hydraulic fluid leaked out of the system probably because the power pack tee fitting was slightly loose. There was considerable usage of the system during the emergency, thus explaining why the fluid depleted itself quickly. Under normal operation, the fluid level would likely have been detected and rectified.

CONCLUSIONS:

Findings:
1. The pilot could not extend the right main landing gear.

2. The right main landing gear was locked in the up position.

3. The clevis pin on the right landing gear that normally connected the uplock latch to the hydraulic system was missing, thus preventing release of the uplock.

4. The cotter pin that secures the left-hand clevis pin was missing.

5. The missing cotter pins on the right and left gear-uplock clevis pins were not detected during previous maintenance inspections.

6. Both lock nuts on the turn-buckles that attach the uplock latches to the hydraulic system were loose.

7. The hydraulic reservoir was empty and there was a leaking T-fitting on the left side of the hydraulic power pack.

Causes:
There was inadequate maintenance and inspection of the main landing gear.

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M. DZUBA FB-1A FLYBABY
(Amateur-built) CF-VTV
CHURCHBRIDGE CHAMPION AIRPARK, SASKATCHEWAN
24 JUNE 1989

BRIEF NUMBER: 89-C0121 (Accident)
LOCAL TIME: 1900 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	48	3
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The newly licensed pilot was attempting to land the amateur-built aircraft on the grass runway. The pilot misjudged his height above the ground and began to flare too soon. The aircraft landed hard, causing substantial damage to the landing gear, propeller, engine, right wing, and the fuselage.

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AERONCA 11AC C-GUAV
TSACHA LAKE, BRITISH COLUMBIA
28 JUNE 1989

REPORT NUMBER: 89-P0159 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 2015 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A. – Expired)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	529	490
LAST 90 DAYS	24	24

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot reported that he had flown his wheel-equipped aircraft low over his neighbour's lakeside lodge to attract his attention and that, during the climb-out, the

aircraft lost speed and stalled into the trees. Witnesses from the lodge stated that the pilot made several low passes over his neighbour's property and that the passes were followed by steep climb-outs and dives. They stated that, during one of those fly-bys, the wheels of the aircraft touched the surface of the lake. Just before the occurrence, the aircraft was observed to be in a steep, right-hand turn at about 70 feet above the water and flying toward the trees on the shore. The aircraft pitched up sharply, the right wing hit the trees, and the aircraft crashed to the ground and was substantially damaged. Rescuers found the pilot unconscious in the wreckage.

The pilot was taken to his neighbour's lodge where he was examined by two medical doctors. When he regained consciousness, he told those in attendance that he had been drinking; half of a bottle of rye whiskey was found in the wreckage. The pilot was then flown to the nearest hospital and placed under observation for several days before he was released.

A routine blood sample was taken from the pilot following his arrival at the hospital, and it tested positive for ethanol; the ethanol level, at 193 milligrams per cent (mg%), was more than twice the legal upper limit for driving a motor vehicle.

The pilot held a United States private pilot licence, and the medical validation certificate had expired in 1986. He did not hold a Canadian pilot licence, and his Canadian student pilot permit had expired.

The weather at the time of the accident was suitable for visual flight and was not a factor in the occurrence.

The pilot, who was under the influence of the alcohol he had consumed, operated his aircraft in a dangerous and reckless manner. He crashed into the trees because his judgment and reflexes were probably impaired by alcohol.

CONCLUSIONS:

Findings:
1. The pilot's blood alcohol level was 193 mg%.

2. The pilot flew the aircraft in a reckless and dangerous manner.

3. The pilot was flying at low level and misjudged his pull-up over the shoreline.

4. The pilot's medical licence validation certificate was expired.

Causes:
The pilot attempted a flight while impaired by alcohol.

STINSON 108-2 C-GZHV
BARKER CREEK AIRSTRIP, YUKON TERRITORY
29 JUNE 1989

BRIEF NUMBER: 89-W0136 (Accident)
LOCAL TIME: 1850 PDT
OPERATION: Private – Other
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	510	14
LAST 90 DAYS	40	14

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The aircraft was on a visual flight which had originated from Dawson City, Yukon. The pilot had received verbal information on the location of the Scroggy Creek, Yukon strip and intended to fly the aircraft owner there for a meeting. He located a runway which matched the description of the Scroggy Creek strip and, after three attempts, landed only to find that he was on the Barker Creek strip. There had been recent thunderstorm activity in the area, and the runway, which was 1,100 feet long and 2,400 feet above sea level, was muddy. The pilot walked the strip to determine the exact length and evaluate the surface condition. The wind was light to calm, and he decided to take off toward the northwest. There was an eight-foot embankment at the end of the runway with trees behind. The pilot used a short-field technique for the take-off, and the aircraft became airborne near the end of the runway at 55 mph indicated airspeed (IAS). As the pilot banked the aircraft to the right to avoid the embankment and trees, the left wing stalled and the left wing tip struck the ground. The aircraft cartwheeled and came to rest in an inverted position. The pilot was uninjured, and the passenger sustained a cut forehead.

PIPER PA-31-310 NAVAJO C-GRTU
LOURDES-DE-BLANC-SABLON AIRPORT, QUÉBEC 2.5 mi N
03 JULY 1989

BRIEF NUMBER: 89-Q0190 (Accident)
LOCAL TIME: 2134 EDT
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	983	283
LAST 90 DAYS	226	226

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	4
PASSENGER	–	–	–

REPORTED CIRCUMSTANCES:

The aircraft had been unserviceable for six weeks, and after repairs had been made, it was taken on a local test flight at night. After take-off, a few turns were executed, and the pilot then returned to the airport to carry out a few circuits on runway 24. While on downwind, the aircraft entered a fog bank. The pilot continued the flight by conducting a complete non-directional beacon/distance measuring equipment (NDB/DME) approach to runway 24. During the approach, the pilot crossed the 5.5 DME fix inbound at the published altitude of 2,100 feet above sea level (asl). The published approach then required the descent to continue until crossing 2.5 DME at 950 feet asl.

In anticipation of encountering visual conditions, the pilot continued the descent and crossed the 2.5 DME fix at approximately 750 feet asl. Seconds later, the aircraft contacted the ground at an elevation of 500 feet asl. The landing gear was torn off, and the aircraft slid to a stop. Field elevation is 117 feet asl.

PIPER PA-25-150 PAWNEE C-GJCX
YORKTON, SASKATCHEWAN 15 mi SSE
04 JULY 1989

BRIEF NUMBER: 89-C0128 (Accident)
LOCAL TIME: 2000 CST
OPERATION: Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

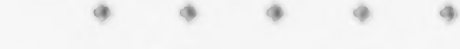
PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	550	40
LAST 90 DAYS	50	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was taking off from a farm road. The aircraft, with a load of 60 gallons of water, lifted off at about 70 mph and started to drift to the left. The aircraft contacted trees along the side of the road and came to a stop in heavy willow bush.

The wind was from the right at about four knots.



CESSNA 120 C-GMNG
ST-LAMBERT-DE-LÉVIS AIRPORT, QUÉBEC 2 mi W
07 JULY 1989

REPORT NUMBER: 89-Q0192 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1330 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport Rating

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,000	25
LAST 90 DAYS	50	6

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The aircraft departed St-Lambert-de-Lévis, Québec on a visual flight rules (VFR) sightseeing trip. During the climb, at an altitude of approximately 400 feet above

ground level, the engine (Continental C 185 12 F) sputtered and lost power. The pilot immediately switched the fuel selector valve from the right main tank to the left main tank and selected carburetor heat on, but to no avail. A forced landing was carried out in an unprepared field. On touchdown, the aircraft overturned. Both occupants escaped uninjured.

The aircraft was fuelled to capacity three weeks before the accident, using automotive unleaded gasoline. The aircraft was left outside for the entire period and was subjected to various weather conditions. Prior to the flight, the pilot drained some fuel from the aircraft tanks but did not notice the presence of water.

Because the aircraft came to rest in an inverted position, all the fuel from the left wing tank leaked out. After the aircraft was put back in the upright position, a fuel sample was taken from the right wing tank. The large sample contained a substantial amount of water and some dirt.

The engine stopped because of water contamination in the fuel, but the source of the water was not determined. However, it is possible that, during the period the aircraft was inactive, water accumulated in the wing tanks because of condensation, and the tanks were not completely drained of the water before the start of the flight. When the pilot drained the tanks, the samples taken could have been of water, but, because of the large quantity of water present, the pilot might have assumed the samples to be of pure fuel and stopped draining.

CONCLUSIONS:

Findings:
1. The fuel sample taken from the right wing tank revealed water and dirt in the tank.

2. The forced landing was carried out in an unprepared area.

Causes:
The engine power loss was due to the water contamination in the fuel.

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BEECHCRAFT 19A SPORT C-GGQV
WYOMING, ONTARIO
09 JULY 1989

REPORT NUMBER: 89-G0313 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1115 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	697	180
LAST 90 DAYS	2	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	1	-
PASSENGERS	-	1	-

SUMMARY REPORT:

The pilot and one passenger were departing on a local flight. During the take-off roll, the aircraft did not appear to be accelerating normally, and the pilot aborted the take-off. On the second attempt, the aircraft became airborne, and, after lift-off, the pilot initiated a right turn. Moments later, the aircraft descended steeply into trees approximately 688 feet from the end of the runway and came to rest in a ditch. The pilot and passenger sustained serious injuries.

Reported weather conditions in the area were cloud 9,000 feet broken, visibility 15 miles, temperature and dew point 25 and 19 degrees Celsius respectively, wind from 180 degrees magnetic at seven knots, and relative humidity 69 per cent.

The 2,250-foot turf runway which is oriented north/south was in good condition and had a slight rise to the south in the direction of take-off.

The pilot held a valid pilot licence and, over a five-year period, had flown an average of 2.7 hours per year. The pilot stated that he did not refer to any flight instruments or engine gauges during flight and relied solely on "feel" to complete the take-off and climb-out.

Witnesses reported that the aircraft engine sounded normal during take-off but that the ground speed appeared to be slow. The aircraft maintained a nose-high attitude during climb-out until it descended into the trees. The passenger stated that the aircraft descended right-wing-low into the trees, with the control column at full left aileron deflection.

Neither the pilot nor the passenger remembered hearing the stall warning buzzer. During examination of the

wreckage, electrical power was supplied to check the operation of the stall warning system. Several attempts to move the sensing vane on the leading edge of the left wing were made before the horn sounded. No other evidence of any failure or malfunction of the aircraft or any of its systems was found.

The pilot, who did not fly the aircraft on a regular basis, attempted to fly the aircraft by "feel" rather than by relying on the flight and engine instruments. The high density altitude was responsible for the unexpected reduced aircraft performance and an elongated take-off roll, which caused the pilot to abort the first take-off. During the second take-off, the aircraft was forced into the air using a high angle of attack, and it climbed briefly until it flew out of ground effect. In an attempt to climb over trees in his path, the pilot raised the nose of the aircraft, and the aircraft began to descend. The pilot realized that the aircraft was not going to avoid the trees ahead so he began a turn to the right. The turn aggravated the situation, and a stall was induced. When the pilot attempted to lift the down-going right wing using the aileron, the stall condition was exacerbated, and the aircraft descended into trees.

CONCLUSIONS:

Findings:
1. The pilot flew an average of 2.7 hours per year over a five-year period.

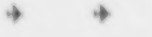
2. High outside air temperature and humidity reduced the performance of the aircraft.

3. A safe airspeed was not maintained for the take-off and climb out.

4. The flight instruments and engine gauges were not being monitored during the take-off and climb-out.

5. When the pilot attempted to climb over trees at the end of the runway, the angle of attack was increased, and the aircraft stalled.

Causes:
The proper airspeed for climb-out was not maintained, and the aircraft stalled with insufficient altitude to recover.



PIPER PA-18-150 C-GNOO
EXETER LAKE, NORTHWEST TERRITORIES
10 mi SW
12 JULY 1989

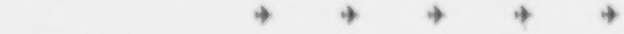
BRIEF NUMBER: 89-W0156 (Accident)
LOCAL TIME: 1200 MDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	4,100	N/A
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was landing on an esker and used heavy braking to avoid overrunning the landing area. The aircraft nosed over, damaging the propeller, wing struts, and one wing.



CESSNA 182P C-GWNG
ALEXANDRIA AIRPORT, ONTARIO
20 JULY 1989

BRIEF NUMBER: 89-O/0342 (Accident)
LOCAL TIME: 1100 EDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	46	43
LAST 90 DAYS	46	43

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

After a supervised cross-country flight from Lachute, Québec under visual flight rules, the pilot made an approach to runway 25 at Alexandria Airport, Ontario. On touchdown, the aircraft bounced, and the pilot, while attempting to recover, inadvertently applied the brakes. When the aircraft touched down again, the aircraft veered left and struck a ditch that ran adjacent to the run-

way. The nosewheel collapsed, and the aircraft nosed over.

CESSNA C150L C-GHTO
PENTICTON, BRITISH COLUMBIA 8 mi W
22 JULY 1989

REPORT NUMBER: 89-P0184 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1700 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,500	1,500
LAST 90 DAYS	20	20

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	1	–

SUMMARY REPORT:

The pilot and passenger departed the Penticton airport during the late afternoon for a short visual flight to a small mountain valley located eight miles west of the airport. Friends and acquaintances of the pilot were gathered in a meadow for a picnic and camp-out, and the pilot was to overfly the assembly to drop air-filled balloons, one of which contained a prize. The pilot had completed two flights over the assembly, and he was circling for another when the aircraft encountered a downdraft, collided with trees, and crashed to the ground. The aircraft was substantially damaged, and both occupants were seriously injured. At the time of the accident, the valley was in bright sunlight and the visibility was unlimited. The surface winds in the meadow were light; however, witnesses said that the wind appeared to be stronger higher on the mountainsides.

The aircraft was maintained in accordance with existing regulations and directives. The weight and balance were within the prescribed limits. The aircraft was not equipped with shoulder harnesses.

The pilot had been medically disqualified to hold a pilot's licence, and most of his recent flying was with a qualified pilot on board. However, on this day, the other pilot was ill and unable to accompany him. The pilot's medical condition was not a factor in the accident.

The valley floor is 2,900 feet above sea level (asl), about 1,500 feet wide, and bordered by high ground to the north, south, and west. The pilot approached the centre of the meadow from the west, and the passenger dropped the balloons from his window as the aircraft passed overhead the campers. The height of the aircraft over the meadow was described by various witnesses as very low to 800 feet above ground.

After overflying the assembly, the pilot reversed course by entering a right climbing turn. This turn placed the aircraft about 500 feet above the elevation of the meadow, but, because of the steeply rising ground on either side of the narrow valley, the aircraft was only a few feet above the trees on the mountainside. When the pilot encountered the downdraft and the aircraft began to descend, he attempted to maintain height; however, the aircraft was too close to the mountain, and the pilot was unable to avoid the trees. The occupants survived the accident because the aircraft's forward speed was reduced gradually as it descended through the trees. It is probable that both occupants' injuries would have been less severe had shoulder harnesses been available and worn.

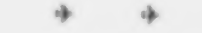
CONCLUSIONS:

Findings:
1. The pilot was flying low over the mountainside.

2. The aircraft encountered a downdraft.

3. The pilot's licence had been cancelled due to medical disqualification.

Causes:
The pilot was flying at low level in an unsuitable area.



CESSNA P172D SKYHAWK C-GVSY
FORT ASSINIBOINE, ALBERTA 6 mi N
23 JULY 1989

BRIEF NUMBER: 89-W0163 (Accident)
LOCAL TIME: 1730 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	450	200
LAST 90 DAYS	10	10

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

The pilot landed in a hay field to contact a ground crew involved with a missing persons search. The field was very wet and rough; the pilot had flown over the field to inspect it but, from the air, could not see that the area was unsuitable for landing. On landing, the nosewheel buckled and the propeller struck the ground.

CESSNA 140 C-FIBB
TRACY, QUÉBEC
09 AUGUST 1989

REPORT NUMBER: 89-Q0232 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2012 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,200	8
LAST 90 DAYS	50	4

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The pilot and one passenger were on a local pleasure flight. Before take-off, the pilot placed the fuel selector in the centre position so that the engine would be fed from both tanks. After 40 minutes of flying time, the engine misfired several times and lost power. As he had been making right turns for several minutes, the pilot thought the fuel had been transferred to the right tank, so he turned the selector to the right. The engine resumed normal operation, and the pilot placed the wings in a level attitude and continued the flight. The engine stopped a few minutes later, and the pilot tried to find a suitable landing area. He landed in a field with a firm but rough surface. The aircraft bounced and travelled 500 feet in the air and then touched down near a ditch running between the field and the road. The pilot applied the brakes and turned left to avoid the ditch. The aircraft rolled over and came to rest on its back. The occupants were not injured.

Impact and deceleration forces were not sufficient to activate the emergency locator transmitter (ELT).

The pilot was qualified for the flight, but he had little experience on this type of aircraft. He owns another aircraft, a Cessna 180, which has a fuel selector with four positions marked as follows: LEFT, BOTH, RIGHT and opposite BOTH, OFF. Examination of the aircraft revealed that the left wing tank was half full, the right wing tank was empty, and the fuel selector was in the OFF position. It was also determined that the fuel gauges mounted in the wings functioned properly and that, on this type of aircraft, the fuel selector has only three positions: LEFT, RIGHT and OFF.

Before take-off, the pilot placed the fuel selector in the centre position, which he thought was BOTH. However, on this type of aircraft, he had actually selected RIGHT. When the engine stopped, he automatically turned the selector to the right without looking at it. He thought he had selected the other tank, but he had actually selected OFF. Rather than selecting the left wing tank, which contained some fuel, he cut off the fuel supply. As a result, the engine stopped. The landing was made on an unprepared field.

CONCLUSIONS:

Findings:
1. The pilot had little experience on type, and he operated the fuel selector of the Cessna 140 as though it were that of a Cessna 180.

2. After the right wing tank was exhausted and the engine stopped, the pilot inadvertently cut off the engine fuel supply while attempting to switch to another tank.

3. The pilot landed on an unprepared field and the aircraft turned over.

Causes:
The pilot had little experience on type, and he operated the fuel selector of the Cessna 140 as though it were that of a Cessna 180.

CESSNA 182A SKYLANE C-FZPJ
BARRHEAD, ALBERTA
12 AUGUST 1989

REPORT NUMBER: 89-W0191 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1130 MDT
OPERATION: Private Other
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	3,500	900
LAST 90 DAYS	30	30

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot took off from the Barrhead airport with four parachutists on board and climbed for about 30 minutes to 9,500 feet above sea level (7,500 feet above ground level). After the parachutists had jumped, the pilot descended to the airport, but, as he joined the circuit, the engine lost all power. Attempts to restore power were unsuccessful, and the pilot made a forced landing in a ploughed field, 300 feet from the runway. The aircraft nosed over immediately and was substantially damaged. The pilot sustained a serious head injury when he struck the instrument panel.

Three U.S. gallons of fuel were drained from each wing tank at the accident site. Although the aircraft had been upside down for several hours before being examined, there was no indication of substantial fuel loss. This early model of Cessna 182 has only a single fuel outlet located near the bottom centre of each tank. Each tank retains 1.5 U.S. gallons of unusable fuel. An additional 3.5 gallons may be unusable when the aircraft is in any attitude other than straight and level. For practical purposes, the aircraft has up to 10 U.S. gallons of unusable fuel. Because of damage to the engine during the crash, it could not be test run. No other discrepancy was noted during the investigation.

The aircraft was not equipped with shoulder harnesses.

The pilot did not check the quantity of fuel on board the aircraft prior to departure.

Because the aircraft was in a nose-down attitude for several minutes while descending from 9,500 feet, it was operating in the attitude where there was 10 U.S. gallons of unusable fuel. The large quantity of unusable fuel is the result of the location of the single tank outlet near the bottom centre of the tank which becomes unported when the fuel moves to the front or rear of the tank. The engine lost power due to fuel exhaustion because there was only six gallons of fuel on board the aircraft.

The pilot may not have been injured had the aircraft been fitted with a shoulder harness.

CONCLUSIONS:

Findings:
1. The aircraft had six U.S. gallons of fuel remaining in the tanks.

2. This aircraft has up to 10 U.S. gallons of unusable fuel in any attitude other than straight and level.

3. The engine lost all power because of fuel exhaustion.

4. The pilot might not have been injured had the aircraft been equipped with a shoulder harness.

Causes:
The pilot did not ensure that he had an adequate fuel load for the intended flight.

PIPER PA-25-235 PAWNEE C-FUAG
TRAMPING LAKE, SASKATCHEWAN
16 AUGUST 1989

BRIEF NUMBER: 89-C0167 (Accident)
LOCAL TIME: 1000 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,500	600
LAST 90 DAYS	58	51

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The wind was calm when the pilot departed from the grass strip for a short flight. When he returned, the wind velocity had increased to approximately 13 knots. The pilot elected to land into wind on an unprepared, stubbly grass field instead of attempting a cross-wind landing on the prepared strip. The approach and touchdown were normal, but, during the landing roll, the pilot lost control

of the aircraft on the rough field, and the aircraft nosed over.

CESSNA C-337 SKYMASTER C-GQRZ
BORDEN, ONTARIO
19 AUGUST 1989

BRIEF NUMBER: 89-O/0408 (Accident)
LOCAL TIME: 1645 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	397	198
LAST 90 DAYS	38	37

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The aircraft departed from Barrie Ontario. After a touch-and-go landing, then a full-stop landing at Borden, the pilot backtracked and took off again to do a full circuit. On final approach, the landing gear was not lowered, and the aircraft landed on its belly.

PIPER PA-18 SUPER CUB C-GRLT
ATLIN, BRITISH COLUMBIA 50 mi S
27 AUGUST 1989

BRIEF NUMBER: 89-P0230 (Incident)
LOCAL TIME: 1000 PST
OPERATION: Private Recreational
DAMAGE: Minor
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,600	1,222
LAST 90 DAYS	40	40

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The aircraft, which was fitted with oversize tires, had carried out a normal landing on a mountain strip. When the pilot applied the brakes, the left landing gear collapsed. The pilot reported that he found a pre-existing crack in the landing gear tubing.

CESSNA 172M SKYHAWK C-GYIF
LAKE SUPERIOR, ONTARIO
31 AUGUST 1989

REPORT NUMBER: 89-O/0429 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2235 EDT
OPERATION: Private Company Business
DAMAGE: Unknown
PILOT LICENCE: Commercial (Expired)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	2,570	N/A
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	2	–	–

HISTORY OF THE FLIGHT:

The pilot and two passengers were on a short cross-country flight from Wawa, Ontario to Sault Ste Marie, Ontario. The pilot advised the Sault Ste Marie Airport Controller that he was circling 20 miles north of the airport due to low cloud that was lying on higher elevation between his present position and the airport. After circling for approximately 20 minutes, the pilot advised he was going to return to Wawa. Moments later, the pilot broadcast "we're going down." There was no further communication and a full-scale search was initiated.

The accident occurred during night hours. The elevation of the search area (Lake Superior) is 601 feet above sea level.

PERTINENT INFORMATION:

The weather observations taken at Sault Ste Marie were as follows:

2200 EDT – Measured ceiling 1,800 feet overcast, visibility 12 miles, temperature 16 degrees Celsius, dew point 16 degrees Celsius, wind 060 degrees true at six

knots, barometric pressure 29.74 in. Hg, cloud layer strato cumulus 10/10.

2300 EDT – Measured ceiling 1,500 feet overcast, visibility eight miles, temperature 16 degrees Celsius, dew point 16 degrees Celsius, wind 060 degrees true at seven knots, barometric pressure 29.72 in. Hg, cloud layer strato cumulus 10/10.

On 31 August 1989, at 1900 EDT, a weak, newly formed frontal wave was situated about 30 nautical miles west of Gore Bay. A low pressure centre over southwestern Minnesota was linked to the wave by a frontal trough. By 0200 EDT, a new low centre formed along the trough northeast of Green Bay and moved across Lake Michigan to lie in northern lower Michigan at 0600 EDT. Showers and occasional thunderstorms were present in the vicinity of the trough up to about 120 nautical miles northwest of the trough. The airmass was moist at low levels and fairly warm. As a result, occasional instrument flight rules (IFR) ceilings and visibilities were reported and forecasted, specially near the trough and over Lake Superior. Thunderstorm activity over the planned route was spotty and confined to the route's southeasternmost portion. The freezing level reported at Sault Ste Marie for 2000 EDT, 31 August, lay at 12,000 feet mean sea level (MSL).

The last weather observation (2000 EDT) taken at Wawa, Ontario prior to the weather office closing gave 500 feet scattered, estimated ceiling 7,000 feet broken, 10,000 feet overcast, visibility 15 miles, temperature 12 degrees Celsius, dew point 11 degrees Celsius, wind from 030 degrees true at two knots, barometric pressure 29.82 in. Hg, cloud layers stratus fractus 1/10, alto cumulus 8/10, alto stratus 2/10.

There is no evidence that the pilot obtained a weather briefing, and no flight plan was filed. Sault Ste Marie Tower became aware of the flight only when the pilot initiated communication with the controller at 2205 EDT and requested an airport advisory. The controller gave the pilot the current weather and an air traffic control clearance into the control zone. At 2213 EDT, direct controller/pilot communication (DCPC) was lost apparently due to high terrain between the aircraft and the airport which caused the very high frequency (VHF) line of sight transmissions to be obstructed. Communication was re-established via relay with airliners overflying the area. The pilot advised that he could not maintain terrain clearance as he approached the airport due to low lying cloud and was circling approximately 15 nautical miles north. He then advised his intentions to return to Wawa.

At 2234 EDT the pilot announced to Sault Ste Marie Tower "we're going down."

Search and Rescue from Trenton, Ontario was dispatched to Sault Ste Marie. On the fourth day of the search, the body of one of the passengers was retrieved from Lake Superior as well as a few other articles confirmed to be from aircraft C-GYIF. The aircraft, the pilot, and the other passenger were not found.

Eyewitness reports obtained from around the accident locale stated that, after circling in the Goulais Bay area, the aircraft proceeded toward Ile Parisienne which is southwest of the holding area and a further 13 nautical miles out in Lake Superior.

The day prior to the accident date, the pilot flew the aircraft from Thunder Bay, Ontario to Marathon, Ontario where he refuelled with 92.7 litres of fuel. He then flew to Wawa where the aircraft remained until the accident flight. The airport operations at Wawa close daily at 2000 EDT, and there were no eyewitnesses to the departure of this flight from Wawa.

Review of the pilot's medical file revealed that the pilot received his last medical examination on 05 May 1987. A category 1 medical was issued which gave him commercial pilot privileges to 01 December 1987. His medical was not renewed; however, his licence still gave him private pilot privileges until 01 June 1988, after which his licence was deemed to be expired. The licence was endorsed with a night and seaplane rating, but it was not endorsed for instrument flying. His instrument training is unknown but unlikely more than the five-hour minimum required for the night rating.

ANALYSIS:

The loss of communication with the aircraft, combined with the articles found in the water, indicated that the aircraft crashed into Lake Superior. There has been no recovery of the aircraft to date, and, therefore, it is not possible to determine if the aircraft crashed as a result of mechanical problems, loss of control, or for any other reason.

An accurate flight history of the aircraft could not be compiled due to the remoteness of operation, the time of operation of the airport facilities, and the lack of eyewitnesses for departure time confirmation. Based on direct routing from Marathon to Wawa to Sault Ste. Marie, with consideration for circling the area and sound fuel tank integrity, calculations show there would be ample fuel on board for the return flight to Wawa, and, therefore, fuel exhaustion as a cause for this accident seems remote.

The flight path as flown from Goulais Bay toward Ile Parisienne was perhaps indicative that further attempts were made to reach Sault Ste Marie airport via shoreline

routing, which would allow terrain clearance. Flight over water at night with no ambient lighting can produce the same flight conditions as those which require a pilot to be instrument rated. Control of an aircraft operated in these conditions can be lost quickly by a pilot who has little or no instrument training.

CONCLUSIONS:

Findings:
1. The weather immediately north of Sault Ste Marie was not conducive for VFR flight.

2. The aircraft crashed into Lake Superior.

3. The aircraft has not been found.

Causes:
The intended flight path of the aircraft over land did not provide maintenance of terrain clearance due to low level cloud. The aircraft crashed in Lake Superior for undetermined reasons.

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BEECH 95B55 BARON C-GTYP
MONT-JOLI AIRPORT, QUÉBEC
07 SEPTEMBER 1989

REPORT NUMBER: 89-Q0257 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0916 EDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,000	175
LAST 90 DAYS	44	12

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot took off from the airport at Rimouski, Québec, on a flight to Drummondville, Québec, for a business meeting. During the initial climb and after retracting the landing gear, he noticed that his speed was below normal and that the red warning light was illuminated, indicating that the landing gear was not fully retracted. He tried to extend the gear using the normal procedure, but was unsuccessful. He then advised the flight service station (FSS) at Mont-Joli of the situation, and indicated that he was returning to land at his point of departure. He then engaged the autopilot, disabled the landing gear retraction motor, and activated the landing gear emergency hand crank. He first turned the crank to the right, then to the left. He did not obtain an indication of gear down and locked. He cancelled his landing and again attempted to lower the landing gear, but to no avail. He requested clearance to fly over the Mont-Joli airport so the underside of the aircraft could be observed. Shortly afterward, the FSS employee confirmed that the landing gear was not fully extended. The pilot then advised the FSS that he would make a wheels-up landing, and requested that the emergency equipment be dispatched. He made an extended approach and set the aircraft down on its belly 1,000 feet beyond the threshold of runway 24. The aircraft slid 500 feet before coming to rest. It was substantially damaged; the pilot was uninjured.

A special weather report issued a few moments after the accident indicated visual flight rule conditions with scattered cloud at 25,000 feet, visibility six miles, a seven-knot wind from the southwest, and a temperature of 22 degrees Celsius.

The aircraft had been refuelled the night before the accident, and the pilot still had an endurance of four hours when he made the forced landing.

The pilot was experienced on type, but had never used the manual gear extension procedure in a situation where the regular system had actually failed. The emergency procedure he followed is not consistent with the recommended procedure.

The technical and aircraft log-books showed that the aircraft was certified in accordance with existing regulations.

The gear retraction system was checked two months before the accident during a 500-hour inspection. The brushes of the electric motor were checked at that time; however, contrary to the aircraft manufacturer's recommendations, they were not replaced. Following the inspection, the pilot returned the aircraft to Québec City because the gear retraction was too slow. During ground testing, the pilot's complaint was confirmed on the first retraction. However, as subsequent test retractions were within the normal time range, the chief engineer said the problem had disappeared, and the aircraft was returned to service.

A few days later, the pilot reported having the same problems with the landing gear. The person in charge at the workshop in Québec City advised him to return the aircraft to the shop, but this was not done. At the time of the accident, the gear had been retracted 25 times since the inspection.

An inspection of the aircraft landing gear revealed that one brush in the electric motor was seriously damaged, the failure of the burnt contact spring had cut the flow of electrical current to the armature, and the motor had become unserviceable when the gear was retracted on take-off. The emergency landing gear extension mechanism functioned normally, and, on the ground, it was capable of extending and locking the gear without difficulty.

As the brushes in the electric motor had only been checked rather than being replaced during the last inspection as recommended, it is probable that one of the two brushes was not reinstalled properly. This led to an increase in the contact resistance of the brush on the armature, overheating, premature deterioration of the brush, motor malfunction, and finally to a failure of the gear retraction system. Following this failure, the pilot, who was experienced on this type of aircraft but had never had to use the emergency gear extension system, was unable to operate the system correctly, and he had to make a wheels-up landing.

CONCLUSIONS:

Findings:

1. Contrary to recommendations, the brushes in the electric motor used to drive the landing gear retraction system were checked but not replaced.

2. The deterioration of one of the two brushes made the electric motor unserviceable during the gear retraction cycle, preventing the gear from retracting fully into its well after the take-off from Rimouski.

3. Although the pilot was experienced on this type of aircraft, this was the first time he had to use the emergency landing gear extension procedure, and he was unable to operate the emergency gear mechanism correctly.

Causes:

The brushes of the electric motor used to drive the landing gear mechanism were not replaced during the last inspection, and the pilot did not follow exactly the emergency procedure for extending the landing gear.

PIPER PA-28R-200 ARROW II C-GHYM
WINDSOR AIRPORT, ONTARIO
25 SEPTEMBER 1989

REPORT NUMBER: 89-O0467 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2140 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	175	130
LAST 90 DAYS	11	10

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

SUMMARY REPORT:

The pilot took off from Toronto Island Airport, Ontario on a visual flight rules flight to Windsor Airport, Ontario. While en route, the aircraft electrical system gradually lost all power, and, overhead Windsor Airport, the pilot was unable to communicate or extend the landing gear. The aircraft landed wheels-up on runway 20 and skidded upright to a stop.

Before take-off, the pilot experienced radio communication problems and returned to the ramp. The problems were not positively identified; however, the pilot was loaned a portable hand-held very high frequency (VHF) radio as a precautionary measure. Shortly after the aircraft cleared the Toronto Terminal Control Area, communications were lost. The pilot attempted to re-establish communications with the portable radio but was unsuccessful. As the flight progressed, the pilot noticed the fuel gauges decreasing abnormally and the instrument lights dimming. He concluded that the electrical system had malfunctioned but decided to continue the flight to Windsor. The pilot overflew Windsor Airport at 6,500 feet above sea level (asl) and determined that runway 25 was in use. He circled, attempted to contact air traffic control and, then to avoid possible conflict, decided to land on runway 20. The pilot tried to extend the landing gear, but could not locate the emergency landing gear extension lever. With no means of extending the landing gear, he landed the aircraft with the gear retracted.

Examination of the aircraft revealed that the alternator output wire had broken loose from the alternator terminal connector and that the battery had discharged. In addition, the emergency landing gear extension lever had been disabled (a portion cut off) and placards had been removed. Piper Aircraft Corporation Service Bulletin No. 866, requiring the removal of the "Automatic

Gear Extension System", had been performed on the aircraft. However, the Service Bulletin does not specify removal or disabling of the emergency landing gear extension lever.

Because the alternator output wire broke, the battery was no longer being charged, and the aircraft electrical equipment (radios, etc.) gradually depleted all battery power. The radio problems experienced before take-off may have resulted from this low-voltage condition. The Piper Service Bulletin had been carried out incorrectly, and the pilot did not have any means of manually extending the landing gear once the battery power had been depleted.

CONCLUSIONS:

Findings:
1. A broken alternator output wire resulted in the battery discharging and all electrical power being lost.

2. The emergency landing gear extension lever had been disabled.

3. The pilot was not able to extend the landing gear without electrical power.

4. The radio problems before take-off may have resulted from low battery voltage.

Causes:
The electrical system malfunction and the disabled, emergency landing gear lever prevented the pilot from extending the landing gear.

CESSNA T303 CRUSADER C-GSNA
SUDBURY, ONTARIO
04 OCTOBER 1989

REPORT NUMBER: 89-O0483 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1547 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,550	30
LAST 90 DAYS	100	15

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	3

SUMMARY REPORT:

The aircraft departed from Timmins for Barrie, Ontario with the pilot and three passengers on board. During the final approach to runway 25 at Barrie, the aircraft descended rapidly from an estimated height of 100 feet. The aircraft struck the ground hard, and the right main landing gear separated from the aircraft. The pilot aborted the landing and continued the flight to home base in Sudbury. The pilot flew by the Sudbury Tower, and it was confirmed that the right gear was missing. The runway was foamed in preparation for a gear-up landing. The landing was uneventful, and the aircraft came to a safe stop on the runway. All occupants evacuated the aircraft without difficulty.

The pilot obtained Muskoka weather information from Muskoka radio while en route to Barrie. The wind reported was from 280 to 300 degrees magnetic at 20 gusting to 34 knots. During the approach into Barrie, contact was attempted with Barrie Unicom to determine weather conditions; however, there was no radio operator available to respond. A short time after the aborted landing, the wind at Barrie was reported as gusting from 20 to 36 knots from the northwest.

The pilot was familiar with Barrie Airport and had flown from this airport a total of eight times. The Canada Flight Supplement, section Aerodrome/Facility Directory, effective 21 September 1989, adds a cautionary note to the Barrie Airpark information. The note reads, "Possible wind shear landing runway 25 in northwest surface winds exceeding 10 knots." The wind shear conditions are created by the location of buildings and silos near the threshold of the runway.

To compensate for gusty wind conditions, the Transport Canada Flight Training Manual recommends adding to the calculated approach speed an amount equal to half the wind gust factor. During the approach, the wind was gusting 20 to 36 knots, thus the gust factor was 16 knots. Adding half of this value to the approach speed of 82 knots that the pilot was reportedly using would result in a compensatory approach speed of 90 knots.

The failed portion of landing gear comprised the trailing link assembly, wheel, and brake. The knuckle pin, which holds the trailing assembly to the trunnion assembly, was sheared approximately one inch from the end; the failure was indicative of overload. The pin was also sheared in a rear outboard direction. Examination of the ground markings at Barrie showed that the aircraft struck the turf prior to the runway, with the right main gear first and while crabbing to the right.

Examination of the wreckage revealed that, after separation, the right gear struck and bent the horizontal stabilizer and elevator in such a manner that the clearance

between the elevator and the horizontal stabilizer was reduced. The pilot reported no abnormalities with any of the flight controls during the flight to Sudbury.

The pilot had been on duty with his employer, a MEDEVAC operator, for 12 hours before departing on this flight. The pilot was on standby alert for the 12 hours, although he did get four hours of rest during this shift. This flight departed in the morning, less than one hour after the shift was completed.

The wind shear effect that the buildings near the threshold of the runway produce when a northwest wind is predominant has led to a cautionary warning in the Canada Flight Supplement. The pilot had flown from this airpark and should have been aware that the possibility of wind shear existed for this landing. Although the pilot was not aware of the exact wind conditions at Barrie, he nevertheless was aware of turbulence and should have adjusted his speed accordingly.

During the approach, the aircraft encountered a wind shear and lost lift. The rapid loss of altitude did not allow the pilot time to recover or reduce the crab angle, and the aircraft landed in this attitude. The heavy downward impact and the torsional twist on the right gear as the aircraft straightened to remain on the runway heading produced a stress on the landing gear that it was not designed to withstand.

CONCLUSIONS:

Findings:
1. The aircraft encountered a wind shear condition during the approach into the Barrie Airpark.

2. The aircraft lost altitude rapidly and struck the ground while in a right crabbing attitude.

3. The right trailing link assembly attachment pin failed in overload, and the trailing link separated from the remaining landing gear.

4. The recommended procedure for a landing in gusty wind conditions was not complied with, resulting in a lower approach speed and the aircraft stalling.

5. The pilot aborted the landing and continued to Sudbury where a [illegible]-up landing was carried out.

Causes:
The pilot did not adjust the approach speed for the gusty wind conditions.

GRUMMAN AMERICAN AA5B TIGER C-GQIE
DURHAM, ONTARIO 4 nm SE
07 OCTOBER 1989

REPORT NUMBER: 89-Q0489 (Accident)
INFORMATION SOURCE: Field investigation
LOCAL TIME: 1500 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	170	48
LAST 90 DAYS	22	22

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	1	2

SUMMARY REPORT:

The pilot and passengers were on a visual flight rules (VFR) cross-country flight from St. Thomas, Ontario to a private grass strip. During the approach to land on the rolling slippery wet grass surface, there was a 30-degree cross-wind at 15 gusting to 20 knots. Initial touchdown, followed by a bounce, was made one third of the way down the runway, which coincided with the beginning of an upslope section. The pilot pumped the brakes to avoid locking the wheels on the wet surface, but, when the aircraft reached the crest of the slope, he realized there was insufficient runway remaining on which to stop. The aircraft overran the end of the runway, continued down an embankment, and struck a tree.

The pilot was qualified for the flight and his licence was medically valid. The wreckage was examined, and no discrepancies were noted.

The runway length available was 2,000 feet; a tree, approximately 28 feet tall, was located 150 feet east of the runway threshold on the approach. The runway surface was bumpy, slippery wet grass, and a brake pumping action was used to slow the aircraft. The approach was flown at 70 knots indicated airspeed with the flaps retracted. According to the Pilot's Operating Handbook, the short-field landing distance for this runway environment is 1,046 feet. These published distances are based on performance figures derived using level, dry, hard surface runways, maximum braking and average piloting techniques. The Handbook indicates the approach is to be flown at 63 knots indicated airspeed with the flaps fully extended. The pilot felt that he was familiar with the Operating Handbook and did not reference the Performance Section for this landing. Although the pilot had landed at this aerodrome once before, he was

unaware that the runway ended just beyond the crest of the upslope portion.

Under optimum conditions, using the recommended landing techniques, there was sufficient runway available to perform an uneventful landing. However, the approach was made at an airspeed higher than recommended, with the flaps retracted. After touchdown, a brake pumping action was used in an attempt to stop the aircraft. These factors resulted in a substantial increase in the required landing distance. The pilot had not referenced the Pilot's Operating Handbook for the requirements of this approach and landing, and the aircraft overran the end of the runway.

CONCLUSIONS:

Findings:
1. The approach was made in a strong cross-wind to a slippery wet grass runway.

2. The pilot used a brake pumping action to stop the aircraft.

3. The pilot made an approach at an airspeed higher than recommended and without the use of flaps.

Causes:
The pilot did not use the recommended approach and landing techniques.

MOONEY M20J C-GXMV
DAVIDSON, SASKATCHEWAN 6 mi W
16 OCTOBER 1989

BRIEF NUMBER: 89-C0204 (Accident)
LOCAL TIME: 1315 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,100	1,100
LAST 90 DAYS	40	40

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The pilot forgot to select the landing gear down and landed on a private grass landing strip with the gear retracted. The belly of the fuselage and the propeller were damaged in the accident.

PIPER PA-18-150 C-GIYJ
HAINES JUNCTION, YUKON 20 mi NW
26 OCTOBER 1989

BRIEF NUMBER: 89-W0258 (Accident)
LOCAL TIME: 1200 PDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,500	5,000
LAST 90 DAYS	200	200

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The pilot made a low pass over the frozen lake that he was hoping to land on and decided it would be unsuitable. Wanting to land as close as possible to his horses, he decided to try an old strip he had prepared several years back. He selected skis down and touched down in what was approximately two inches of snow. As the landing appeared to be successful, the pilot reduced power. Approximately 500 feet down the strip, after slowing to about five mph, the aircraft struck a large mound in the snow with the landing gear. The impact bent the right gear leg and caused the right wing tip to be dragged through a bush. The unevenness of the strip was not apparent because of the high overcast conditions.

CESSNA 180 C-FN4X
LLOYDMINSTER AIRPORT, ALBERTA
30 OCTOBER 1989

BRIEF NUMBER: 89-W0261 (Accident)
LOCAL TIME: 1636 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	102	57
LAST 90 DAYS	52	52

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

REPORTED CIRCUMSTANCES:

During the landing roll, following a cross-wind landing, the left main tire blew. The pilot applied some power in an attempt to prevent the aircraft from weather cocking into wind. As the aircraft slowed down, it came to rest on the left gear leg. The left gear leg and brake assembly were damaged.

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CESSNA 172 SKYHAWK C-GWXL
CACHE CREEK BRITISH COLUMBIA
19 NOVEMBER 1989

BRIEF NUMBER: 89-P0307 (Accident)
LOCAL TIME: 0920 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	151	40
LAST 90 DAYS	14	14

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	2

REPORTED CIRCUMSTANCES:

The pilot overflew the Cache Creek airstrip at mid-field and noted that there was a strong wind from the west. As the aircraft proceeded downwind and turned onto final, it was buffeted by moderate turbulence. When the aircraft was lined up with the runway on final, a ravine running through the approach area created the perception that the aircraft was above the desired glide path, so the pilot extended full flaps and decreased the airspeed. On short final, the aircraft encountered a sudden severe downdraft. The pilot applied full power but was unable to recover from the descent. Just prior to ground impact, he stalled the aircraft in an attempt to minimize injuries and damage. The aircraft was substantially damaged on impact. The pilot and two passengers received minor injuries.

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CESSNA 140 CF-ZOK
CUDWORTH, SASKATCHEWAN
13 DECEMBER 1989

BRIEF NUMBER: 89-C0231 (Accident)
LOCAL TIME: 1545 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	310	23
LAST 90 DAYS	10	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The pilot stated that the run-up and check-out were normal and that the controls were free and operating correctly prior to take-off. He departed to the east into the wind using take-off flap. He let the airspeed build to 65 to 70 miles per hour and stayed low to the ground. The pilot retracted the flap and adjusted the control column to maintain a slow climb. He found he could not move the control column forward. The aircraft was in a steep climb when the pilot retarded the throttle to the idle position. The aircraft's nose lowered, and the pilot landed the aircraft in a field. After touchdown, the aircraft nosed over in the deep snow.

An aircraft engineer who examined the aircraft found that the elevators locked in the nose-up position about eight degrees above centre line. The down cable on the elevator had very little tension. The link in the cable was jamming on the lightening hole in the rear bulkhead, thereby preventing the elevator from moving downward and creating a nose-up deflection.

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CESSNA 337A SKYMASTER C-FVEY
BEAVERLODGE AIRPORT, ALBERTA 1 mi SW
18 DECEMBER 1989

BRIEF NUMBER: 89-W0288 (Accident)
LOCAL TIME: 1000 MST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	344	104
LAST 90 DAYS	20	20

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The aircraft was departing Beaverlodge, Alberta on a visual flight to Red Deer, Alberta. As the aircraft lifted off the runway, the rear engine stopped. The pilot continued the take-off, established a 100-foot-per-minute rate of climb with the front engine at full power, and tried unsuccessfully to restart the rear engine. He did not feather the rear propeller, and, as he attempted to return to the runway, the front engine began to intermittently lose power. He force-landed the aircraft in a field approximately one mile from the airport. Damage was reported as a bent front propeller, a detached left main gear and nose gear, and a buckled left wing. The pilot was not injured.

The pilot did not hold an endorsement for, nor had he ever received dual flight training on, this type of aircraft. He reported that the engine problems may have been a result of lean front which built up in the half-full main fuel tanks during recent extreme temperature changes and became dislodged during the prolonged taxi, blocking the fuel screens.

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PIPER PA-22-108 COLT C-FNQU
SHERBROOKE, QUÉBEC
04 JANUARY 1990

BRIEF NUMBER: 90-Q0008 (Accident)
LOCAL TIME: 1230 EST
OPERATION: Private Recreational
DAMAGE: Substantial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	296	176
LAST 90 DAYS	2	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES

The pilot was making touch-and-go landings on runway 14. On the third landing, the aircraft touched down about 30 metres from the runway threshold, in 50 centimetres of snow. Shortly after touchdown, the nose-wheel struck the ground and bent rearward. The aircraft slid on its engine cowling and came to rest at the threshold.

The pilot indicated that the aircraft was operating normally during the approach, but the lack of contrast during that phase of the flight prevented him from judging his altitude accurately.

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CESSNA 140 CF-KON
LINDSAY, ONTARIO 5 mi NE
19 JANUARY 1990

BRIEF NUMBER: 90-O0026 (Accident)
LOCAL TIME: 1350 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	345	180
LAST 90 DAYS	7	7

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The approach was flown high to clear trees near the threshold, and the aircraft landed too far down the runway. The pilot was unable to stop the aircraft prior to the end of the runway because of icy surface conditions. The aircraft overran the runway end and came to rest on its nose.

CESSNA 150A C-FNBA
SUDBURY, ONTARIO 4 mi NW
21 JANUARY 1990

REPORT NUMBER: 90-G0027 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1600 EST
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	10,000	2,000
LAST 90 DAYS	50	50

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

SUMMARY REPORT:

The aircraft was on a local flight with an instructor and student on board. The flight was a test being conducted on the student so he could obtain his private pilot licence. On returning to Sudbury airport, the engine (Continental O-200-A) began to lose power. The instructor maintained some engine power by pumping the primer; however, this was only successful for a short period of time. When the flight could no longer be continued, the instructor carried out a forced landing in a field. After touchdown, the aircraft's nosewheel dug into three feet of snow, and the aircraft came to rest on its nose. The weather reported at Sudbury airport at 2100 Co-ordinated Universal Time was cloud measured 2100 feet broken, 4000 feet overcast, temperature minus 14 degrees Celsius, dew point minus 22 degrees Celsius, with the wind from 060 degrees at eight knots.

The student carried out the pre-flight check which included sampling the fuel in the tanks. The student reported that the samples contained no water contamination.

During the winter months some of the local flyers had experienced fuel screen blockage due to ice crystals in the fuel collecting at the fuel screen. In an act of prevention, the student/owner poured a small container (150 ml) of auto gas line anti-freeze into each tank. This type of anti-freeze, methyl alcohol, is not approved for aircraft engines. It does not readily mix with aviation fuel but instead settles to the bottom of the tank, causes seals to swell, and lowers the octane rating of aviation fuel.

Cessna has recognized the importance of using fuel additives during cold weather operations and issued Service Letter SE79-30 in June 1979. The Service Letter defines the correct type of additive, the precise quantity to be used, and how it should be mixed.

Examination of the aircraft revealed that the right tank was empty of fuel and the left tank contained approximately three gallons. The fuel selector was in the "on" position which allowed the engine to be supplied with fuel from both tanks simultaneously. A fuel sample was drained from the left fuel tank into a clear plastic container; the methyl alcohol in its clear form settled at the bottom with fuel floating on the alcohol. There was a distinct separation between the two liquids. The gascolator bowl was drained, and the same two liquids were in the sample. The carburetor was disconnected, and there was no fuel found in the bowl. There was no blockage of the fuel feed lines to the engine. The gascolator bowl contents were not examined to determine if ice crystals had formed on the screen.

The aircraft had a fuel capacity of 26 U.S. gallons divided evenly between the two wing tanks, of which 22.5 gallons is usable. The fuel remaining was three gallons in the left tank of which only 1.25 gallons was usable. This was likely sufficient fuel to return to the airport, four miles away, but not with the required 45 minute reserve.

Although the investigation was unable to determine that ice crystals had been present in the gascolator bowl, the absence of fuel in the carburetor, the fact that there was no blockage of the fuel lines, and the cold temperatures, indicate a possible ice build up on the gascolator bowl screen. The screen being blocked by ice would restrict the fuel flow to the carburetor, as was evident by the empty carburetor bowl, and the engine would quit from fuel starvation. The instructor regained some power for a short period of time by using the fuel that remained in the primer line.

CONCLUSIONS:

Findings:
1. The engine quit as a result of fuel starvation.

2. The instructor was unable to find a suitable field for the forced landing and landed in a field covered with approximately three feet of snow.

3. The manufacturer's recommended procedures were not followed with regard to fuel anti-icing additives.

Causes:
The engine quit from fuel starvation, which occurred for undetermined reasons.

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PIPER PA-28-180 C-FZHF
QUÉBEC AIRPORT, QUÉBEC
2 FEBRUARY 1990

BRIEF NUMBER: 90-Q0040 (Accident)
LOCAL TIME: 1135 EST
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	32	32
LAST 90 DAYS	10	10

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The student pilot was on a solo flight practicing touch-and-go landings. After taking off and doing one circuit, the aircraft landed on runway 30. After touchdown, about 900 feet beyond the threshold, the aircraft veered left and the pilot was unable to regain control. The aircraft was substantially damaged when it came to a stop against a snow embankment on the left side of the runway.

The winds were from the right at approximately 12 knots. Approximately 30 percent of the runway surface was covered with ice.

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CESSNA 210L C-GVBD
DUPUIS LAKE, QUÉBEC
18 FEBRUARY 1990

BRIEF NUMBER: 90-Q0055 (Accident)
LOCAL TIME: 1500 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	509	144
LAST 90 DAYS	5	5

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

The pilot intended to land on a private airstrip on the frozen surface of the lake. He had relied on a trade magazine that indicated that the runway was 3,000 feet long. On final approach, a slight tail wind placed the aircraft a little higher than it should have been, and it touched down farther down the runway than planned. The frozen surface was too slippery for braking, and the pilot estimated that he would not be able to bring the aircraft to a complete stop within the remaining distance. Because two other aircraft were parked at the end of the runway, the pilot steered the aircraft into a snowbank on the side of the runway.

When the pilot measured the runway after the incident, he discovered that it was 2,300 feet long. The frozen surface had been covered with sand, but the sun had melted it into the ice, rendering braking ineffective.

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PIPER PA-12 SUPER CRUISER CF-SFM HAZELTON, BRITISH COLUMBIA 5 mi N 25 FEBRUARY 1990

BRIEF NUMBER: 90-P0064 (Accident)
LOCAL TIME: 1030 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	150	26
LAST 90 DAYS	3	3

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot departed the Salmon River airstrip on a local flight. On climb-out, he heard a loud bang, and the aircraft became nose-heavy and began to descend. The pilot maintained full power and initiated a left turn in an attempt to return to the strip for landing. When the pilot realized that he was descending too rapidly to reach the landing area, he force-landed the aircraft in a wooded area 100 yards off the end of the strip.

After the accident, the pilot examined the wreckage and established that the panel covering the right fuel tank had separated along the leading edge of the wing when the attachment screws pulled free. The airflow over the wing was disrupted when the forward portion of the panel bent upward. The resulting increased drag and loss of lift precluded continued flight. The right panel had been removed when the fuel tank was repaired several months prior to the accident. Subsequent to this repair, the panel was removed to permit further inspection of the area. It was not determined why the attachment screws pulled free.

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PIPER PA-31 NAVAJO C-GITJ TUKTOYAKTUK AIRPORT, NORTHWEST TERRITORIES 02 MARCH 1990

BRIEF NUMBER: 90-W0058 (Accident)
LOCAL TIME: 1246 MST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	7,000	1,000
LAST 90 DAYS	N/A	30

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

Prior to landing at Tuktoyaktuk, Northwest Territories, the pilot was unable to obtain a left main gear down and locked indication. He cycled the gear several times and completed an emergency extension with the hand pump; however, he still did not get a safe gear-down indication. Ground observers confirmed the gear appeared to be extended during a low fly-past. The left main gear collapsed on landing after the aircraft rolled approximately 2,500 feet. Damage consisted of a bent left main gear door, a bent left flap, a scraped wing tip, and curled left propeller blades. The pilot reported that the left main landing gear downlock failed, allowing the gear to retract near the end of the landing roll. He also reported that it was necessary to cycle the gear on the previous landing to obtain the proper gear-down-and-locked indication for the right main gear position.

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PIPER PA-28 140B C-GUFK
BLACK'S POINT, MANITOBA
10 MARCH 1990

BRIEF NUMBER: 90-C0036 (Accident)
LOCAL TIME: 1400 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	378	338
LAST 90 DAYS	22	21

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

The pilot and his two passengers were on a pleasure flight to take pictures of a friend's cabin. Conditions appeared favourable for a landing on the snow-covered surface of the frozen lake. From the air, the snow on the lake was estimated to be five inches deep. The pilot landed the aircraft. Shortly after touchdown, the nosewheel landing gear collapsed. The aircraft slid to rest in an upright attitude and the uninjured pilot and passengers climbed from the aircraft. After the occurrence, the snow was estimated to be an average of ten inches deep with drifts of up to fifteen inches deep. The aircraft nosewheel assembly failed rearwards as the nosewheel sank into drifted snow.

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BEECHCRAFT V35 BONANZA C-FZJA
MONT-JOLI, QUÉBEC
25 MARCH 1990

BRIEF NUMBER: 90-Q0076 (Accident)
LOCAL TIME: 1630 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	204	129
LAST 90 DAYS	1	1

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The pilot was on a private recreational flight between Rimouski and Mont-Joli, Québec, where he aimed to land on the threshold of runway 33. According to the pilot, the wind was blowing from the left at approximately 30 knots. On short final, the aircraft entered a downdraft and the nosewheel struck a fence. The pilot made a go-around and asked for a visual check of the nose gear. He also requested the attendance of the Crash Fire Fighting Rescue (CFR) services on runway 24. As soon as the nosewheel touched down, the aircraft skidded to the right and came to a stop off the runway. The damage to the aircraft was limited to the nose gear and the propeller.

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AERONCA 7AC CHAMPION C-GCQV
ALFRED, ONTARIO
26 MARCH 1990

BRIEF NUMBER: 90-O/0133 (Accident)
LOCAL TIME: 1200 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	8,000	13
LAST 90 DAYS	200	9

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

While taxiing to runway 36, the left wheel broke through an ice-covered rut. The left wheel was prevented from further movement by the ice edge, while the right wheel crossed the rut and continued to roll. The resultant force on the left wheel, which swung the aircraft to the left, and the right rear tailwind (310 degrees magnetic at 20 knots), which weathercocked the aircraft to the right, caused distortion of the left gear oleo case frame.

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PIPER PA-18 CLIPPER C-FMLZ
CHARLOTTETOWN, NEWFOUNDLAND
06 JANUARY 1989

BRIEF NUMBER: 89-A0009 (Accident)
LOCAL TIME: 1600 NST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	107	25
LAST 90 DAYS	25	25

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot of the ski-equipped aircraft was commencing his take-off for a local flight from Charlottetown Harbour. At a speed of 45 miles per hour, the pilot heard a bang. The aircraft ground looped and settled to the right, coming to rest on the left ski and the right wing tip.

Examination of the broken axle revealed that a fatigue-initiated crack existed prior to the accident. The crack was impossible to detect before the axle broke because the area was covered by other metal. The axle failed in overload.

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CESSNA 185B SKYWAGON C-GGOP
LAC DU BONNET, MANITOBA 17 mi SE
21 JANUARY 1989

REPORT NUMBER: 89-C0017 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1415 CST
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	8,500	3,000
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	2	–	–

HISTORY OF THE FLIGHT:

The pilot, his wife, and their son departed Lac du Bonnet, Manitoba Airport in their wheel/ski-equipped aircraft at approximately 1300 CST for a local pleasure flight. At about 1330 CST, the aircraft was seen doing a touch-and-go landing on Nutimik Lake, 17 miles southeast of his departure point. At 1700 CST, a group of snowmobile operators discovered the wreckage on the shore of Numao Lake, four miles northeast of Nutimik Lake. The three occupants received fatal injuries in the accident.

PERTINENT INFORMATION:

The left wing of the aircraft struck the tops of three 65-foot-high trees bordering the lake, severing 18 inches of the wing and half of the aileron. The aircraft rolled and crashed almost vertically nose-down on the shore 400 feet beyond the last tree strike. The aircraft bounced a further 25 feet coming to rest in an inverted position. A post-crash fire consumed the entire cabin and engine compartment. The propeller separated from the engine on the initial impact. The emergency locator transmitter (ELT) was destroyed in the fire.

The pilot was observed checking the contents of the fuel tanks prior to departure. He commented that there was sufficient fuel on board for several hours of flight and more than enough for the intended flight. The weather on the afternoon of the accident was ideal for the planned flight. The conditions reported in the area during the afternoon were 22,000 feet thin, scattered, visibility 15 miles, temperature minus four degrees Celsius, dew point minus eight degrees Celsius, and wind from 300 degrees at five knots.

The pilot was very familiar with the area and would have known that the ice was unsafe for landing in the centre of the lake. He also would be aware that, in the event of an emergency, the safest place to land would be parallel to the shore due to the heavy slush conditions that always existed on the lake away from shore.

The engine and flight controls were inspected, and there was no indication of any control irregularity. The wing flaps were determined to be in the retracted position on impact. The ski check cables were intact and were properly attached to the airframe fittings.

When the propeller separated from the crankshaft, the studs were pulled out of the propeller hub and showed no evidence of rotation on separation. The propeller was dismantled, and it was determined that the pitch was low on impact. The low pitch stop was imprinted with an impression of the circlip retainer. This could only occur if the propeller was in low pitch on impact, other-

wise the oil trapped in the dome would prevent the stop from contacting the circlip. If the engine was producing power, the propeller would have been in the governed range and not on the low pitch stop.

The engine was examined, and no pre-impact internal failure had occurred. The engine fuel system had suffered considerable fire damage so it was impossible to determine if any fault had existed prior to impact. The ignition was checked and showed no evidence of malfunction.

The exhaust system was forwarded to the Canadian Aviation Safety Board Engineering Laboratory for metallurgical analysis. It was determined that the exhaust pipes were below the normal operating temperature when they were crushed on impact. A pre-crack existed along a weld bead between the muffler and the exhaust pipe. It is considered likely that some exhaust leakage occurred, but the extent could not be determined.

ANALYSIS:

On impact, the engine was producing low power as evidenced by the propeller blade angle, the lack of rotational damage, and the low exhaust pipe temperature. It is probable that the engine suffered a power loss. While carrying out a forced landing on the lake, the aircraft struck trees, causing the pilot to lose control and crash.

CONCLUSIONS:

Findings:

1. It is probable that the engine suffered a loss of power.

2. The aircraft struck trees during the forced landing attempt.

3. The aircraft was destroyed by a post-crash fire.

4. The ELT was destroyed in the post-crash fire.

5. A pre-crack existed along the weld where the exhaust pipe joins the muffler.

Causes:

The cause of the probable loss of engine power could not be determined.

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PIPER J3 CUB CF-DCZ
UCLUELET, BRITISH COLUMBIA 18 mi NE
27 MARCH 1989

REPORT NUMBER: 89-P0075 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1300 PST
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	550	55
LAST 90 DAYS	70	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	1	–	–

HISTORY OF THE FLIGHT:

The pilot and one passenger departed Courtenay Lake, British Columbia in a float-equipped Piper aircraft on a proposed one-hour visual flight across Vancouver Island to Tofino. At 1230 Pacific standard time (PST), one-half hour after take-off, the pilot made an en-route position report at Port Alberni, which is situated at the head of Alberni Inlet. The aircraft did not arrive at destination. It was found five days later on the northeast shore of Uchuck Lake, 34 miles east of Tofino. The aircraft burned following impact. There were no survivors.

PERTINENT INFORMATION:

The pilot had been recently issued a commercial licence. He was qualified on the aircraft type and had had 55 hours of float-plane experience. He was familiar with the area and with the visual flight rules (VFR) route to Tofino via Port Alberni and the Alberni Inlet. This route is commonly used when low cloud and visibility preclude direct flight over the high terrain between Courtenay and Tofino. The pilot did not file a flight plan or otherwise indicate his proposed route prior to departure. It was reported that he had occasionally practised flight in marginal VFR conditions to gain experience in adverse weather.

There was no evidence that incapacitation, physiological, or psychological factors affected the pilot's performance.

On take-off, the aircraft was within the centre of gravity limits; however, it was estimated to be 224 pounds in excess of the maximum allowable take-off gross weight of 1,220 pounds. Prior to departure, the aircraft had been refuelled with 22 gallons (160 pounds) of aviation

fuel. The aircraft empty weight was 986 pounds, and with the 22 gallons of fuel plus the two occupants, the gross weight of the aircraft was estimated to be 1,444 pounds.

Uchuck Lake, which is 0.5 miles wide and 1.5 miles long, is situated along a valley route between the mouth of Alberni Inlet and Tofino. The lake, in conjunction with the Alberni Inlet, forms part of a VFR route to Tofino. The lake elevation is 300 feet above sea level (asl), and there is high terrain (3,000 feet asl) on the north and south side. The ground at the west end of the lake rises abruptly to 800 feet asl before sloping gradually down to sea level.

There was a strong southwesterly flow of moist and unstable air over the area. Embedded towering cumulus convection-type cloud and associated rainshower activity was reported. The ceilings were 2,500 to 4,000 feet asl with layers to 15,000 feet. The freezing level was 3,000 feet.

Tofino weather reported at 1300 PST, the estimated time of arrival, was sky condition 1,300 feet scattered, estimated ceiling 2,500 feet overcast, visibility 10 miles in rainshowers, temperature seven degrees Celsius, dew point five degrees Celsius, wind 150 degrees magnetic at 06 knots, altimeter setting 29.76 inches of mercury, clouds and obscuring phenomena, towering cumulus four-tenths, stratocumulus six-tenths sky coverage.

The pilot of another aircraft operating along the coast at the estimated time of the occurrence reported ceilings as low as 1,000 feet asl west of the accident site.

Wreckage examination established that the aircraft was in a steep low-level right turn at the west end of Uchuck Lake. The right wing struck a fallen log which protruded out from the shoreline. The aircraft then cartwheeled through 90 degrees and came to rest in a extreme nose-down attitude with the floats straddling a large log. Due to the destruction of the aircraft by the intense fuel-fed fire, it could not be conclusively determined whether any pre-impact failure or malfunction contributed to this accident; however, none was identified.

ANALYSIS:

The pilot apparently elected to fly to Tofino via Port Alberni due to the low ceilings that could be expected along the direct route. Once at Port Alberni, the weather was presumably adequate to permit him to fly south, along the Alberni Inlet and then west toward Tofino via Uchuck Lake.

As Alberni Inlet is at sea level, the pilot was probably able to avoid low ceilings over that portion of the route. However, on turning west toward Uchuck Lake, the terrain elevation increases to a maximum elevation of 800 feet asl at the end of the lake. VFR weather conditions were reported at Tofino; however, in areas of higher terrain in the vicinity of Uchuck Lake, poor visibility and low ceilings were probable given the moist airmass and upslope conditions. The towering cumulus cloud and associated precipitation prevalent in the area would also have contributed to the reduced visibility and ceilings.

The pilot would have had little difficulty entering the lake valley but would have had to overfly the 800 feet terrain at the west end of the lake. Given the weather conditions, it is likely that this elevated terrain was shrouded in cloud. It is probable that the pilot encountered reduced flight visibility and attempted to turn around at the end of the lake. Wreckage analysis indicated that the aircraft was in a steep right turn when the wing struck the fallen log. The investigation concluded that the aircraft crashed in a turn that was probably initiated by the pilot in an attempt to remain visual when low cloud and fog were encountered.

CONCLUSIONS:

Findings:

1. The pilot probably continued flight into adverse weather conditions.

2. The pilot was probably manoeuvring to avoid low ceilings and cloud when impact occurred.

3. The aircraft maximum allowable take-off gross weight was exceeded.

Causes:

The aircraft crashed during a steep low-level turn that was probably initiated by the pilot in an attempt to remain visual when low cloud and fog were encountered.

DE HAVILLAND DHC-2 BEAVER SP N68084
SONORA ISLAND, BRITISH COLUMBIA
13 APRIL 1989

BRIEF NUMBER: 89-P0087 (Accident)
LOCAL TIME: 1100 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A.)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,050	100
LAST 90 DAYS	17	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

The pilot landed the amphibious aircraft at the Campbell River Airport to refuel and clear customs before proceeding to Sonora Island. Following take-off, the pilot did not raise the wheels. On arrival at Sonora Island, the pilot did not check the gear position and landed on the water with the wheels down. The aircraft nosed over on touchdown and was substantially damaged. The pilot and passengers escaped uninjured.

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CESSNA A185F SKYWAGON C-GJOQ
CHEMUNG LAKE, ONTARIO
09 MAY 1989

REPORT NUMBER: 89-O/0203 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1855 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,015	30
LAST 90 DAYS	0	0

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The pilot and passenger were taking off from Chemung Lake, Ontario for a local flight. After lift-off, the aircraft descended and struck the water surface. It then flipped and came to rest in an inverted position. The aircraft had been in storage for the winter, and this was the first flight of the season. The pre-take-off checks were completed, and the pilot began the take-off run. Shortly after lift-off, the pilot retracted the two notches (20 degrees) of flap in increments and reduced the manifold pressure. During the reduction of power, the pilot was monitoring the manifold pressure gauge and visually did not ensure a positive rate of climb. Moments later, the aircraft struck the water and flipped. Witness reports stated that the aircraft gained approximately 50 feet before descending back to the water surface.

Visual meteorological conditions prevailed in the area.

Inspection of the aircraft after the accident revealed no mechanical discrepancies.

The pilot was in the possession of a current licence validation certificate as issued by the Department of Transport, although he had recently undergone heart bypass surgery. This certificate had been issued in error. Retraction of the flaps reduced the lifting surface of the wings and increased the stall speed, and the reduction in manifold pressure reduced aircraft performance. These two factors combined allowed the aircraft to descend back to the water surface.

CONCLUSIONS:

Findings:
1. This was the first flight of the season.

2. The pilot retracted flaps and reduced power only moments after lift-off, allowing the aircraft to lose altitude.

3. The pilot was issued a current licence validation certificate in error.

Causes:
The pilot retracted the flaps prematurely and reduced power without ensuring a positive rate of climb.

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PIPER J3C-65 C-FRAJ
DORÉ LAKE, QUÉBEC
20 MAY 1989

BRIEF NUMBER: 89-Q0130 (Accident)
LOCAL TIME: 1845 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	500	400
LAST 90 DAYS	10	0

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

While returning from a fishing trip, the pilot and his passenger encountered fog about 5 miles from their destination. The pilot decided to land on a lake. During the landing, the floatplane crashed on the shore and was damaged. The pilot and passenger were unhurt.

The pilot had not flown in the aircraft during the previous 90 days or undergone training on the aircraft prior to the flight. The landing was executed in light rain showers and fog. The pilot said he made a "precision approach" in fog banks and had intermittent visual contact with the ground. He touched down too close to the edge of the lake, and the aircraft came to rest on the shore.

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CESSNA A185E SKYWAGON CF-MMR
MORRISON LAKE, ONTARIO 2 mi S
28 MAY 1989

BRIEF NUMBER: 89-O/0230 (Accident)
LOCAL TIME: 1242 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	2,000	700
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

While approaching to land on the water in his amphibious aircraft, the pilot went through his pre-landing check-list which included checking the position of the landing gear, which was down. The pilot continued with the landing on the water with the landing gear extended. When the aircraft touched down, it flipped over.

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VOLMAR VJ22 SPORTSMAN C-FRWR
DAWSON CREEK AIRPORT, BRITISH COLUMBIA
28 MAY 1989

BRIEF NUMBER: 89-W0101 (Accident)
LOCAL TIME: 2048 PDT
OPERATION: Private
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	417	1
LAST 90 DAYS	4	1

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was carrying out circuits onto the grass strip when the landing gear struck the edge of a paved taxiway 200 feet short of the intended landing area. The pilot lost control of the aircraft which then ground looped.

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CESSNA U206G STATIONAIR N9420Z
KAPPAN LAKE, BRITISH COLUMBIA
03 JUNE 1989

BRIEF NUMBER: 89-P0131 (Accident)
LOCAL TIME: 1945 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport (U.S.A.)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	9,000	150
LAST 90 DAYS	55	15

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

After an afternoon of fishing, a low-time float pilot was positioned in the left seat to receive flying instruction from a qualified instructor pilot, and the aircraft was positioned for take-off. The take-off direction was to the west into the glare of the setting sun, and the west end of the lake was hidden in shadows making it difficult to judge the distance available.

The pilot in the left seat was flying the aircraft, and, to obtain the longest possible take-off distance, he attempted to follow a bend in the lake to the southwest. During the take-off run, he experienced difficulty in getting the aircraft onto the step and then in making the aircraft turn around the bend. As the aircraft approached the west shore of the lake, the instructor pilot realized they were too close to the shore to make the turn, and he rejected the take-off. However, his actions were too late, and the aircraft collided with rocks on the shore.

At the time of the accident, the wind was from the west at about five knots, the temperature was 24 degrees Celsius, and the sky was clear. The density altitude was calculated to be about 5,500 feet.

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CESSNA 172M C-GNVP
UMBER LAKE, ONTARIO
25 JUNE 1989

REPORT NUMBER: 89-C0119 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1930 CDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	275	140
LAST 90 DAYS	40	25

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The float-equipped aircraft was being ferried from the Toronto area to Ignace, Ontario with a fuel stop near Sault Ste Marie. During the flight, the pilot encountered deteriorating weather, and he decided to land at Umber Lake to wait for the weather to improve. While he waited, he added four gallons of automotive gas to the aircraft fuel tanks. As darkness approached, the pilot taxied out onto the lake and took off. About two minutes after take-off, the engine started to lose power. The pilot then selected carburettor heat on, which resulted in even more power loss. He turned back to Umber Lake and approached the forced landing in a steep descent and rounded out sharply over the lake. On touchdown, the aircraft swung violently to the right, and the floats sheared off. The aircraft subsequently sank, but the pilot evacuated safely and swam to shore.

The temperature was estimated to be between 13 and 16 degrees Celsius with a humidity of 100 per cent. The visibility was five miles, and there was scattered cloud and a light quartering tail wind on landing. The pilot had limited float experience.

Tests conducted by the FAA Technical Centre on the behaviour of automobile gas in icing conditions revealed that carburettor icing will develop sooner using this type of fuel rather than aviation fuel.

The engine was removed from the water and examined for indications of an abnormality that would have precipitated the power loss; the engine was found to be mechanically sound. The only part of the fuel delivery system that is protected from the entrance of external water when the aircraft is submerged is the fuel strainer. This unit was found to contain uncontaminated fuel.

The pilot took off and climbed out in environmental conditions that, when plotted on the Carburettor Icing Chart of the Aeronautical Information Publication (AIP) Canada, Air Section, article 2.6, predict serious carburettor icing at any power setting. It is likely that, had the pilot used carburettor heat earlier in the take-off sequence, the severe power loss would not have occurred.

The aircraft's airspeed during the round-out just prior to touchdown was excessive, and, as the pilot tried to force the aircraft onto the water, the floats dug in, causing the aircraft to water-loop.

CONCLUSIONS:

Findings:
1. Environmental conditions were conducive to serious carburettor icing.

2. The addition of automotive gasoline may have contributed to the rapid onset of carburettor icing.

3. The engine lost power due to carburettor icing.

4. The aircraft water-looped because of an excessive touchdown speed.

Causes:
The pilot did not use sufficient carburettor heat.

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PIPER PA-18A-150 SUPER CUB C-GWZF
MISSISSAUGA LAKE, ONTARIO
04 JULY 1989

REPORT NUMBER: 89-O/0308 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1445 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,020	0
LAST 90 DAYS	1	0

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	1

SUMMARY REPORT:

The aircraft was on a local flight from Mississauga Lake, Ontario. Prior to taxiing for take-off, the owner asked his passenger if he would like to fly the aircraft. The passenger accepted and occupied the forward seat. The aircraft taxied out and took off into wind toward the tree-covered rising shoreline. During the climb-out, the aircraft's right float struck a tree, and the aircraft crashed into the bush. The pilot and owner were both injured.

The surface winds were reported to be from 200 degrees magnetic at eight knots, the temperature was 28 degrees Celsius and the visibility was four miles in haze at the time of the accident.

Both occupants held valid private pilot licences, but neither held a float endorsement.

The owner stated that the performance and operation of the aircraft was normal during the take-off and climb-out. The aircraft was equipped with dual controls, but the owner was relying on the pilot's judgement because, from the aft seat, the visibility was restricted.

The pilot thought that he had ample room to clear the trees, but one tree was higher than the rest. The right float struck the tree, and the aircraft descended vertically into adjacent trees.

The emergency locator transmitter (ELT) did not activate although it was installed properly and the impact was substantial. Laboratory examination revealed that the ELT failed because of a depleted and corroded battery. There was no indication that an annual performance test had been carried out in the previous two years. The aircraft was otherwise certified, equipped, and maintained in accordance with existing regulations and approved procedures. The weight and centre of gravity were within the prescribed limits.

The lake was of sufficient size to permit virtually unlimited distance for take-off. However, the pilot backtracked to a point where he estimated he would have sufficient distance to complete a take-off and climb-out. Because of his inexperience on floats and the prevailing conditions, he did not allow sufficient distance to conduct the take-off and climb-out safely.

CONCLUSIONS:

Findings:
1. The pilot did not choose a take-off and departure path with a safe clearance over obstructions.

2. The ELT did not activate because a battery was depleted and corroded.

3. Neither the pilot nor the licenced passenger had a valid float endorsement.

Causes:
The pilot did not ensure that there was sufficient distance for a take-off to clear obstacles.

CESSNA A185F SKYWAGON CF-EKG
WATERLOO LAKE, QUÉBEC
09 JULY 1989

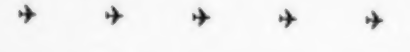
BRIEF NUMBER: 89-Q0197 (Accident)
LOCAL TIME: 1800 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	850	350
LAST 90 DAYS	40	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

During take-off with a tail wind from a small lake, the pilot realized that the distance available was insufficient. He rejected the take-off, but the wind pushed the floatplane toward a small island. The right wing struck a tree, and the aircraft turned over. The pilot said his estimate of the width of the take-off area was incorrect and he should have taken off into wind.



SKEENA AIR GUIDES LTD.
STINSON-2 C-FFJU
FIRESTEEL RIVER, NORTH SMITHERS,
BRITISH COLUMBIA 165 nm
12 JULY 1989

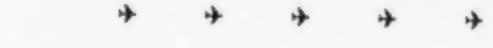
BRIEF NUMBER: 89-P0175 (Accident)
LOCAL TIME: 2010 PDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	6,940	2,200
LAST 90 DAYS	15	15

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

During take-off, engine torque and water current caused the aircraft to turn to the left. The pilot attempted to correct the aircraft's alignment with the application of right rudder. However, the right rudder was restricted because the springs for the water rudder were improperly rigged and did not allow for complete tail rudder movement. The aircraft struck the steep river bank and was substantially damaged.



LAKE LA4-200 N6174
NAIN, NEWFOUNDLAND
21 JULY 1989

REPORT NUMBER: 89-A0180 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0905 ADT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,600	1,550
LAST 90 DAYS	35	35

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The pilot and one passenger departed runway 24 at Nain, Labrador for a planned flight to New Hampshire, U.S.A. The aircraft used the entire length of the 2,000-foot gravel strip during the take-off roll. The pilot forced the aircraft into the air at the end of the runway, barely missing the two-foot-high runway end markers. The aircraft climbed to a height of approximately 50 feet, during which it was observed to be wallowing and rocking. It then veered to the left and crashed in the harbour in a slight left-wing-low, nose-down attitude, approximately one-half mile from the runway. The landing gear had been raised prior to impact. The pilot and his passenger exited the aircraft through the right windshield, which the passenger had kicked out. The aircraft rolled onto its back and sank quickly in 55 feet of water. The occupants had left the aircraft without their life preservers; witnesses who observed their predicament from the shore rescued them from the chilly water in a speedboat.

Post-occurrence investigation found the flaps and flap selector in the up position. The hydraulic system was under pressure, and the gauge read approximately 1,000

pounds per square inch. The aircraft flight manual states that flaps must be full down for all take-offs. "Flaps down" is an item on the pre-take-off check-list. Given the wind and temperature conditions at the time of the occurrence, the normal take-off roll required would be approximately 1,200 feet with flaps down.

Lake Aircraft flight training instructors do not recommend taking off with the flaps in the up position for the following reasons:

– The take-off roll is considerably longer than normal;

– When a pilot is unaware that his flaps are up for the take-off procedure, he will usually force the aircraft into the air. This results in a pronounced nose-up attitude at lift-off, causing a turbulent airflow through the propeller disc thus reducing propeller efficiency. This is known as propeller cavitation. The aircraft usually settles back down on the ground; and

– The wing produces more lift when the flaps are down for the take-off procedure.

The wind was from 330 degrees magnetic at 24 knots. The Canada Flight Supplement for Nain states "wind direction 270 degrees – 360 degrees can cause turbulence and downdraft."

Take-offs from runway 24 at Nain and the initial climb-out are over water. Neither occupant was wearing a life-jacket. Both occupants wore shoulder harnesses which probably saved them from serious injury at impact.

The performance of the aircraft, both during the take-off roll and the initial climb-out, was indicative of a flapless take-off. This was confirmed by examination of the wreckage.

It is therefore apparent that the flaps were up for the take-off procedure. It is also likely that the wind conditions hindered the aircraft's climb-out performance.

Water in northern latitudes is extremely cold, even in the summer. A person immersed can quickly suffer from hypothermia and become incapacitated. If rescue is not immediate, people not wearing life-jackets will drown.

CONCLUSIONS:

Findings:

1. Contrary to the manufacturer's recommendations, the flaps were up for the take-off procedure.

2. Because full flaps were not selected, the take-off roll was longer than normal and the aircraft would not climb after take off.

3. The wind condition at the time of the occurrence may have affected aircraft performance.

4. Neither the pilot nor the passenger wore the available life-jackets.

5. Both the pilot and the passenger wore shoulder harnesses which probably saved them from serious injury at impact.

Causes:
The pilot took off with the incorrect flap setting.

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CESSNA C180F SKYWAGON N2688Y
SCHULTZ LAKE, NORTHWEST TERRITORIES
21 JULY 1989

REPORT NUMBER: 89-C0142 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2100 CDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private (U.S.A.)

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,000	250
LAST 90 DAYS	30	20

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	1	–	1

HISTORY OF THE FLIGHT:

The pilot of the float-equipped Cessna aircraft, N2688Y, departed Baker Lake, Northwest Territories (NWT) at 2030 central daylight time (CDT) in visual meteorological conditions (VMC) on a family fishing trip. A second Cessna 180 aircraft departed at 2045 CDT. Both aircraft carried two passengers and cargo. The aircraft were on flight notifications previously filed with the Baker Lake Flight Service Station (FSS). The aircraft reported to the FSS 20 miles out of Baker Lake, en route to Schultz Lake, NWT, which is about 67 nautical miles northwest of Baker Lake. The pilot of N2688Y planned to land and drop off his passengers and cargo at Schultz Lake and then return to Baker Lake to pick up two other passengers for a second flight to Schultz Lake.

N2688Y was on the final leg of a fishing trip that had originated on 20 July 1989, from Green Bay, Wisconsin via Thunder Bay, Pickle Lake, Gods River, and Churchill. The aircraft arrived at Baker Lake at about 1900

CDT on 21 July. This was the first time the pilot had ever landed at Schultz Lake.

When the aircraft arrived overhead Schultz Lake, the pilots noticed a band of fog lying along the north shore above the fishing camp. The fog seemed to be about 100 feet thick extending in streaks from the shore. The remainder of the lake was clear. N2688Y began an angled approach toward the shore to avoid a long water taxi. The pilot stated that the vertical visibility was good but that, when he began to descend into the fog, the forward visibility deteriorated. Although the winds were out of the south at Baker Lake, he said there was no wind at Schultz Lake. He could see the water clearly out the left window and the water was almost calm except for small rolling waves. He decided to land using the glassy water landing technique and descended slowly into the fog on an angled approach toward the shore. The pilot stated that when the aircraft was about five to six feet above the water, the passenger in the right seat, said something like "we're too close to shore". The pilot applied power to the aircraft and began a shallow 15-degree bank turn to the left, while continuously monitoring the left wing tip which he estimated to be about three feet above the water during the turn. Seconds later, the same passenger shouted "you're still going to hit the shore". Shortly thereafter, the aircraft struck the water and cart-wheeled, coming to rest on its side in about five feet of water, approximately 30 feet from the shore. The right seat passenger drowned.

PERTINENT INFORMATION:

The 63-year-old pilot had received his United States Private Pilot Airman Certificate in 1960. He had accumulated about 1,000 hours total flight time, of which 250 hours were on the float-equipped Cessna 180. In the last 90 days, he had flown approximately 20 hours on this type. There was no evidence that incapacitation, physiological, or psychological factors affected the pilot's performance.

The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures. The weight and centre of gravity were within the prescribed limits. There was no evidence found of any aircraft pre-impact malfunction or unserviceability.

The aircraft was owned and operated by the pilot. All three occupants were wearing lap safety belts. The right seat passenger was also wearing a shoulder harness; the pilot was not wearing his. A shoulder harness was not available to the passenger in the left rear jumpseat. The right rear seat had been removed and an outboard motor, weighing about 86 pounds was lying unsecured on the cabin floor. Sleeping bags and flotation vests were stored in the rear of the aircraft. There was a portable emergency locator transmitter (ELT) on board which activated on impact.

The closest weather reporting station to Schultz Lake is Baker Lake which is about 67 miles from the occurrence site. The weather at Baker Lake at 2000 CDT was reported as sky condition 1,000 feet scattered, estimated 2,000 feet overcast; visibility 20 miles; temperature 12 degrees Celsius; dew point nine degrees Celsius; wind 170 degrees magnetic at 10 knots; altimeter setting 29.92 inches of mercury; remarks strato-fractus 1/10, stratocumulus 9/10. The forecast issued for Baker Lake, which covered the time of the occurrence, was sky condition 1,500 feet overcast, wind 170 degrees true at 10 knots, occasional ceiling 1,500 feet scattered, 4,000 feet overcast; and, at 2300 CDT, sky condition 800 feet scattered, ceiling 2,000 feet overcast, light rain showers, wind 160 degrees at 10 knots, occasional ceiling 800 feet overcast, two miles in light rain and fog. After the accident, the pilot of the other aircraft estimated that there was about a five-knot tail wind from the south blowing toward the shore.

Two other pilots who had landed their Cessna aircraft about 15 minutes prior to the time of the occurrence were aware of the isolated fog condition, and they tried to warn the approaching aircraft using their very high frequency (VHF) radio. They were unable to contact the landing aircraft for unknown reasons so they turned on the tail beacon of their aircraft which was pulled up on the beach. The pilot of N2688Y saw the beacon but was not certain of the significance.

The crew and passengers of the aircraft that landed about ten minutes after the accident reported ice floes in the area of the accident site. Some were quite large and protruded from the water about two to three feet. The pilot of N2688Y does not recall seeing ice on the surface prior to the accident.

The aircraft struck the water in a left-wing-low attitude on a northwest heading and came to rest in a partially inverted attitude. The tail section aft of station 108 and both floats broke off during the accident sequence. Damage to the floats indicated a blunt impact. The tail section was lying ahead of the main wreckage closer to the shore. The left wing tip was exposed above the water surface, and the right wing was folded underneath the fuselage.

When the wreckage was examined, the right wing was attached by the rear spar attachment bolt only and the left wing was attached by the front and rear spar bolt and by the strut.

The pilot stated that he had checked the weather at Baker Lake after he was airborne and that rain was forecast at Schultz Lake for about two hours later. There-

fore, he was anxious to land at Schultz Lake, return to Baker Lake and fly back again, before the rain began. In retrospect, he realized that he should have landed further from shore and avoided the fog, but, at the time, he believed that the fog was isolated and shallow and that the visibility would improve below. He was familiar with the glassy water landing technique and thought that he had allowed for the increased landing distance that it requires. The rolling waves out his left window provided his only visual reference as he did not look ahead during the landing sequence nor in the attempted turn to the left. He did not try to climb as he was intent on completing the turn away from the shore.

The rear seat passenger, who was familiar with the terrain, was able to see the land before the aircraft descended into the fog and then he could not see anything outside the front of the aircraft because of the fog. He thought that the pilot was going to circle again and was surprised when he realized the pilot was preparing to land. He could see the water outside the left window, and he thought he heard the passenger in the right seat shout "altitude" and "bank left". He then saw the land directly in front of the aircraft and thought they were going to collide with the rising shoreline. When the aircraft began to bank to the left, he immediately looked out the left window because he was afraid the left wing tip would strike the water. The next thing he remembered is hearing water rushing into the aircraft.

The second aircraft landed further out in the lake shortly thereafter. They had difficulty finding the accident aircraft in the fog. Two men from the aircraft that was on shore also came to the assistance of the pilot and passenger of the aircraft and attempted to revive the other passenger. The two survivors were put in sleeping bags as they had been in the water for over 15 minutes and were very cold. An Air Canada flight overhead picked up the ELT signal, and the pilot of the other aircraft radioed the Air Canada crew and asked them to notify Baker Lake of the accident and inform them that they were returning with two survivors.

ANALYSIS:

The pilot succumbed to self-imposed pressure to complete the flight before the forecast deteriorating weather arrived. To facilitate a quicker turn around, the pilot chose to land into the fog to avoid a prolonged water taxi. Once in the fog, the forward visibility was reduced and the pilot's visual references to the land were lost. Although the pilot thought that there was no wind when he began the approach, the fact that he saw rolling waves on the water indicates that there was a light wind on the surface. The rising shoreline and treeless environment surrounding Schultz Lake provides very few visual cues for landing.

By using only the water surface out his left window, the pilot did not have sufficient visual reference to safely complete the landing sequence.

The outboard motor was not secured to the aircraft prior to the flight. Although not causal to the accident, this constituted a potentially unsafe situation and could have contributed to the injuries of the occupants, had the motor struck anyone during the accident sequence.

CONCLUSIONS:

Findings:

1. The pilot lost visual reference with the shoreline when he attempted to land the aircraft in fog.

2. Without sufficient visual references, the pilot was unable to maintain his vertical distance from the water surface during an attempt to turn away from the shore.

3. There was no evidence found of any aircraft pre-accident malfunction or unserviceability.

4. The unsecured outboard motor in the rear of the aircraft presented a potential hazard to the occupants.

Causes:

The pilot landed the aircraft too close to the shoreline and in an area of restricted-visibility conditions.

STINSON 108-3 VOYAGEUR C-FZHZ
ARNES, MANITOBA
23 JULY 1989

BRIEF NUMBER: 89-C0146 (Accident)
LOCAL TIME: 1412 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,115	635
LAST 90 DAYS	15	15

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

During the take-off run, the float support structure collapsed, and the aircraft fell onto the floats. The aircraft came to rest partially submerged in the water. The pilot

and passengers were assisted from the aircraft by persons in a nearby boat.

The pilot took off into a wind of about 10 knots, and there were waves two to four feet high.

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LAKE LA4-200 BUCCANEER C-FSNG
LAKE COWICHAN, BRITISH COLUMBIA
26 JULY 1989

BRIEF NUMBER: 89-P0189 (Accident)
LOCAL TIME: 2012 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	884	60
LAST 90 DAYS	2	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

A strong northwesterly surface wind had created rough water and large swells on the surface of the lake, so the pilot decided to take-off in the lee of a small island. At about 55 mph, just before lift-off, the aircraft encountered swells about one foot high and began to porpoise. The pilot rejected the take-off; however, the left wing float struck the water and ruptured causing the left wing to ride low. When the pilot attempted to taxi to shore, the drag from the damaged wing float turned the aircraft left. The strong wind under the high right wing, combined with the off-centre weight of the engine, caused the aircraft to roll upside down. Both occupants evacuated the aircraft without difficulty.

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CESSNA TU206G STATIONAIR 6 C-GBHL
KEEFER LAKE, ONTARIO
29 JULY 1989

REPORT NUMBER: 89-O/0369 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1850 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	2,350	75
LAST 90 DAYS	25	25

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	1	–	–

HISTORY OF THE FLIGHT:

The pilot and his wife were flying to their cottage at Keefer Lake. In preparation for the flight, the pilot did his normal walkaround inspection and then prepared for departure. The aircraft was taxied for departure from runway 21. After take-off, the pilot did not select the landing gear up. The aircraft climbed to 2,500 feet altitude in that configuration, and then the pilot started his descent for Keefer Lake which is 28 nautical miles from Timmins Airport. The aircraft touched down on the water with the landing gear still extended, and the pilot lost control of the aircraft which then came to rest submerged in an inverted position. The pilot exited the aircraft by kicking open the port door window. There is no door beside the front passenger seat where the passenger was sitting at the time of the occurrence but rather is located at the rear starboard side of the aircraft. Boaters on the lake who had witnessed the accident rescued the pilot. They then pulled the passenger from the rear of the aircraft to the water surface where cardio pulmonary resuscitation (CPR) was administered to no avail.

PERTINENT INFORMATION:

Visual meterorological conditions prevailed in the area, and no flight plan was filed for the personal flight.

The landing gear indication systems were inspected and found to be functional.

Earlier in the day, the pilot had terminated the employment of one of his management employees. The pilot stated that this was a long time coming and that it weighed heavily on his mind. He also stated he felt somewhat preoccupied as a result.

ANALYSIS:

Prior to the flight, the pilot had just terminated the employment of one of his management employees. The pilot stated that he felt preoccupied with this, and, as a result, his cockpit duties suffered and he inadvertently left the landing gear extended after take-off from Timmins Airport.

After take-off, the pilot climbed to an altitude of 2,500 feet at which time he started the descent for Keefer Lake. There was no time spent in cruise flight where the pilot would have detected an appreciable difference in normal cruise speed as a result of the landing gear being extended.

CONCLUSIONS:

Findings:
1. The landing gear was inadvertently left extended during a landing on the water surface.

2. The aircraft flipped on touchdown and came to rest submerged in an inverted position.

3. All landing gear systems were functional.

Causes:
The pilot inadvertently left the landing gear down during a water landing.

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PIPER J4A C-FAWS
DEEP RIVER, ONTARIO
31 JULY 1989

BRIEF NUMBER: 89-O/0368 (Accident)
LOCAL TIME: 1830 EDT
OPERATION: Private
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	300	250
LAST 90 DAYS	2	1

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

During a repositioning flight from Cranson Lake, Québec to point Alexander, Ontario, the pilot encountered rapidly deteriorating weather and elected to land on the Ottawa River near Deep River, Ontario. On landing, the aircraft was overturned by strong turbulent winds produced by the passing thunderstorm. The pilot did not obtain a weather report prior to the flight.

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CESSNA A185F SKYWAGON C-GNGC
GARANCIÈRE LAKE, QUÉBEC
18 AUGUST 1989

BRIEF NUMBER: 89-Q0242 (Accident)
LOCAL TIME: 1315 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	720	261
LAST 90 DAYS	40	40

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

The pilot was making a water landing after a short flight originating at Gouin Réservoir, Québec. The pilot steered the aircraft toward the dock but did not reduce power to an appropriate level. When a collision with the dock appeared imminent, the pilot swerved to the right. The left float slid over a rowboat at the edge of the lake, and the right float struck the shore. The aircraft came to rest after colliding with some trees. None of the four occupants was injured, however the aircraft suffered heavy damages.

The pilot said the throttle friction lock was not properly adjusted, which allowed the throttle to slip and increase the engine RPMs. This, combined with a slight tailwind, extended the distanced required for the water landing.

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CESSNA A185E SKYWAGON C-FCVA
LAKE SERGENT, QUÉBEC
02 SEPTEMBER 1989

BRIEF NUMBER: 89-Q0256 (Accident)
LOCAL TIME: 1330 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	180	140
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The pilot of the float-equipped aircraft was departing on a flight to Aberdeen Lake, Québec. The winds were variable and gusting from the northwest at about 15 knots. During the take-off run in a northerly direction, the aircraft encountered a gust of wind. The pilot cut the power, but the left wing was lifted into the air. The right wing struck the water and the right float nosed down before the aircraft came to rest upright. The pilot and passenger were not injured; the aircraft was substantially damaged.

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PIPER PA-18 SUPERCUB N57753
CHAPLEAU, ONTARIO 45 nm SW
03 SEPTEMBER 1989

REPORT NUMBER: 89-O/0433 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1530 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	440	154
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	–	–	1

HISTORY OF THE FLIGHT:

The pilot and his brother had flown from their cottage at Aubrey Lake, Ontario to various lakes for a day of fishing. During departure from the lake surface, the aircraft became airborne and pitched nose-down and came to rest in an inverted position in approximately four feet of water and muck. The passenger exited the aircraft but was unsuccessful in his attempts to extricate the pilot from the wreckage. The pilot drowned.

PERTINENT INFORMATION

The small lake from which the aircraft departed was boomerang-shaped, and a left turn after lift-off was necessary because of the terrain. The aircraft departed in a northerly direction and eventually was headed in a westerly direction as the departure path conformed to the shape of the lake. The passenger reported that, after lift-off, the aircraft climbed and the pilot banked the aircraft slightly to the left. He levelled the wings momentarily and then banked the aircraft to the left again. The wings were levelled again, but this time the aircraft kept skidding left and the passenger detected a distinct engine sound that he did not recognize. The aircraft suddenly pitched nose-down and struck the lake surface.

Due to impact damage, the total amount of fuel on board could not be determined and, therefore, the gross weight of the aircraft at take-off could not be determined. However, considering the weight of the two occupants on board (230 pounds each) and half tanks of fuel (both of which are passenger estimated), fishing gear (10 pounds) and a 13-foot 50-pound aluminum canoe strapped to the left side of the aircraft, the estimated gross weight was calculated to be 1,750 pounds, which is the maximum allowable take-off weight for this aircraft. The externally carried canoe weight is required to be doubled for calculation purposes. The centre of gravity was calculated to be within limits.

When the aircraft struck the water, it became lodged in the lake bottom which consisted of about four feet of loose silt and muck. From the impact damage, it was determined that the aircraft struck the water in an extreme nose-down, right banked attitude. Both wings were bent back and broken at the leading edge root. The tip of the right float was bent upward and perpendicular to its normal position. The propeller struck this float on impact. The tip of the left float was bent upward but not to the same degree. Examination of the propeller revealed that the engine was producing power at the time of impact. The canoe was found on the water surface and used by the surviving passenger. It was indented with a clean impression of the float strut which occurred at impact, indicating that the canoe was attached to the left strut at impact.

The flight controls were inspected for continuity and security, and all responded normally to control stick input. There were no airframe abnormalities noted, and an engine examination revealed no abnormalities.

Visual meteorological conditions prevailed in the area, and no flight plan was filed for the personal flight. The wind was reported to be from 300 degrees magnetic at four knots.

An accurate turn may be described as a change of direction, maintaining a desired angle of bank, with no slip or skid. This is also the description of a balanced or coordinated turn. Skidding is an outward sliding turn manoeuvre because of insufficient bank and/or excess rudder.

ANALYSIS:

There were no abnormalities revealed during the engine examination, and the propeller gave evidence that the engine was producing substantial power at the time of impact.

Carriage of external loads is an accepted practice; however, consideration must be given to its effect. Aircraft performance is degraded.

Though the passenger was not a pilot and did not have a flying background, he described in detail all the symptoms of an uncoordinated turn and subsequent stall. The only way the aircraft could change direction in a wings-level configuration would be as the result of a skid caused by excessive use of rudder. In coordinated flight, the rudder is not used to induce yaw (turn) but only to control it. When an aircraft is skidding, the engine sound changes as a result of the different angle between the airflow and the propeller (fixed pitch).

After take-off, a left turn was necessary because of the terrain. The description of events by the surviving passenger are of an uncoordinated skidding turn in which the aircraft stalled with insufficient altitude to allow recovery.

CONCLUSIONS:

Findings:

1. The aircraft departed at maximum allowable take-off weight with an external load.

2. The aircraft stalled during a skidding turn at too low an altitude to allow recovery.

Causes:

The pilot attempted an uncoordinated turn manoeuvre, and the aircraft stalled with insufficient altitude to allow recovery.

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PIPER PA-12 SUPER CRUISER C-FRRW
LAC INCONNU, QUÉBEC
11 SEPTEMBER 1989

REPORT NUMBER: 89-Q0264 (Accident)
LOCAL TIME: 1600 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENSE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	344	39
LAST 90 DAYS	44	35

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

REPORTED CIRCUMSTANCES:

The pilot was overflying a wooded area at approximately 1,000 feet above ground level. When he rapidly applied full power, the engine responded with only partial power. The pilot selected a lake on which to force-land the aircraft but was unable to reach it. The aircraft landed 180 feet short of the selected area, in dense forest. The pilot and passengers were wearing seat-belts, and no one was injured.

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CESSNA 180J SKYWAGON C-GUHT
SUMMERSIDE, PRINCE EDWARD ISLAND
11 mi W
24 OCTOBER 1989

REPORT NUMBER: 89-A0270 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: N/A
OPERATION: Private – Other
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	4,500	N/A
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	–	–	–

HISTORY OF THE FLIGHT:

The float-equipped aircraft departed Square Lake, New Brunswick at about 1000 Atlantic daylight time (ADT) on the morning of 24 October 1989. The pilot did not file a flight plan or leave a flight itinerary; however, it is known that the aircraft was expected to fly to St. Lawrence, Newfoundland and return to Square Lake before dark on 24 October 1989.

At approximately 1530 ADT on 24 October 1989, the aircraft departed Miquelon, France, an island off the southwest coast of Newfoundland. The aircraft was reported to have made three take-off attempts before successfully becoming airborne. It was observed that there was less than the normal amount of the float visible above the water line, indicating a heavily loaded aircraft.

At 1155 ADT on 25 October 1989, the crew of a military aircraft on a training flight out of Summerside, Prince Edward Island spotted the aircraft floating overturned in Northumberland Strait, about 11 miles west of Summerside. The body of the pilot was found in the cockpit.

PERTINENT INFORMATION:

The aircraft showed no sign of damage normally associated with a take-off or landing accident on water. All the electrical switches were found in the OFF position, including the magneto switches. The emergency locator transmitter (ELT) switch was off. After replacing the magnetos, ignition leads, and plugs, the engine was run, and it ran normally.

An autopsy showed that the pilot died from drowning. The pilot's seat was fully forward, and his seat-belt was fastened, but at the fully loosened position. The aircraft was not equipped with a shoulder harness. The pilot's boots had been removed, and he was not wearing the available life-vest.

All the seats except the pilot's seat had been removed from the aircraft. The rear baggage area contained 6 five-gallon plastic fuel containers, five of which were empty and one of which was full of aviation gasoline. The remainder of the cabin was completely filled with cartons of cigarettes and tins of cigarette tobacco. None of the cargo was secured. Both cabin doors were closed; the window in the right door was open.

Flying time between Miquelon and Square Lake for this type of aircraft on 24 October 1989 (considering the wind aloft) would have been about 3 hours and 40 minutes. Official darkness on that day was at 1847 ADT.

Weather conditions forecast for Northumberland Strait for the night of 24 October 1989 called for southwest winds 10 to 20 knots veering to westerly 10 to 15 knots overnight. Forecast sea conditions called for seas of one to two meters. An analysis of tidal patterns concluded that drift due to tidal action would have been minimal, probably less than one mile.

ANALYSIS:

This investigation was conducted in conjunction with a police investigation into a possible smuggling operation. The load found aboard the aircraft in Northumberland Strait was not heavy enough to cause the overweight characteristics observed on departure from Miquelon, so it is probable that the pilot had a different load departing Miquelon and had made an intermediate stop.

It is not known if the pilot landed in Northumberland Strait because of impending darkness, or if the landing was a planned stop. Evidence indicates that the aircraft landed safely and was shut down by the pilot. The unfavourable wind and sea conditions on the night of the accident most likely caused the aircraft to overturn sometime after landing. Because of the unsecured cargo, the pilot would have experienced considerable difficulty exiting the overturned aircraft.

CONCLUSIONS:

Findings:
1. The pilot landed on Northumberland Strait for undetermined reasons.

2. Sometime after landing, the aircraft overturned, most likely due to wind and sea conditions.

3. The unsecured cargo would have hindered the pilot in his attempt to exit the aircraft.

Causes:
The aircraft overturned after landing, most likely due to wind and sea conditions. The unsecured cargo would have hindered the pilot's attempt to escape from the overturned aircraft.

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PIPER PA-18 SUPER CUB C-FRTR
BRENTON, NOVA SCOTIA
28 OCTOBER 1989

BRIEF NUMBER: 89-A0272 (Accident)
LOCAL TIME: 1140 AST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	35	15
LAST 90 DAYS	3	3

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot/owner was departing a lake in his float-equipped Super Cub aircraft. The weather was 1,500 feet broken, the visibility was more than 10 miles, and the wind was from the southwest at four knots. After lift-off, the aircraft climbed to an altitude of approximately 50 feet, stalled, then landed hard on the water. The float struts, strut attachments, and aircraft fuselage were damaged on landing. The pilot held a student pilot permit but was not operating the aircraft under the supervision of a flying instructor.

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TAYLORCRAFT BC12-D CF-HSX
HAZELTON, BRITISH COLUMBIA 30 mi NE
07 JANUARY 1990

BRIEF NUMBER: 90-P0011 (Accident)
LOCAL TIME: 1530 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	273	147
LAST 90 DAYS	2	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The pilot had just taken off in his ski-equipped aircraft for a local pleasure flight. During climb, at about 600 feet above ground, the engine lost power, and the pilot decided to force-land in a meadow. Realizing he did not have sufficient height to clear trees at the edge of the meadow, the pilot headed toward a nearby river and struck trees on the far side. The aircraft was substantially damaged, but the two occupants were not injured.

The local weather was overcast skies, high humidity, and temperature three degrees Celsius, conditions that were conducive to the formation of carburettor ice.

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CHAMPION 7GCB C-FWYD
NESTOR FALLS, ONTARIO
25 JANUARY 1990

BRIEF NUMBER: 90-C0015 (Accident)
LOCAL TIME: 1030 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	400	300
LAST 90 DAYS	20	20

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

While attempting to turn the aircraft out of a bay on a frozen lake in preparation for take-off, the pilot applied power to swing the tail of the ski-equipped aircraft around. Due to the rutted conditions on the frozen lake the tail initially failed to come fully around in the expected radius of turn. With no brakes available, the aircraft subsequently hit a rock embankment on the far side of the bay. The aircraft received damage to its propeller and undercarriage structure.

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LUSCOMBE 8 SILVAIRE C-FGTR
VICTORIA, BRITISH COLUMBIA
18 MARCH 1990

BRIEF NUMBER: 90-P0152 (Accident)
LOCAL TIME: 1530 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	96	45
LAST 90 DAYS	5	5

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The aircraft was on the after-landing roll when the pilot felt a jar from the rear, and the aircraft quickly darted to the right. The pilot was unable to stop the turn and the aircraft ground-looped. The tail wheel was torn from the fuselage; the right wing and stabilizer were damaged when they struck the runway. The pilot reported that a bolt securing the tail wheel spring mount assembly had broken.

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ROYAL CANADIAN MOUNTED POLICE AIR SERVICES
DE HAVILLAND DHC-6-300 TWIN OTTER
C-FMPH
COLVILLE LAKE, NORTHWEST TERRITORIES
27 MAY 1989

REPORT NUMBER: 89-W0100 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1145 MDT
OPERATION: State
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	4,500	660
LAST 90 DAYS	140	140

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	1	3

HISTORY OF THE FLIGHT:

The pilot was attempting a short field take-off from the Colville Lake airstrip. Directional control was lost as the aircraft veered first to the right and then swung back across the runway to the left edge of the strip. The take-off attempt was continued along the left side of the runway, and the aircraft lifted off after a ground roll of 1,200 feet. As the aircraft became airborne, it rolled to the right, dragging the right wing, and then touched down on the main wheels with the tail skid scrapping along the ground. From this point, the aircraft departed the right side of the runway, proceeding in a direction 35 degrees to the right of the runway heading, and leaving a clear trail through the bush. The aircraft became airborne again, and the left wing struck the roof of a 10-foot-high wooden shed, 88 feet to the right of the runway. The aircraft continued a few feet above the ground for a distance of 400 feet before flying over a 50-foot embankment. It then rolled left and dropped onto the snow-covered muskeg, landing on the left wing. The left wing broke off at the root, and, as the aircraft swung to the left, the right wing also broke off. The occupants, including a large dog, exited unassisted from the wreckage. One passenger, who had occupied the right seat of the cockpit, realized after leaving the aircraft that he had injured his back.

PERTINENT INFORMATION:

Weather conditions were good on the day of the accident. The sky was clear, and the wind was light from the

west. The visibility was more than 15 miles, and the temperature was eight degrees Celsius.

Runway 28 at Colville Lake has a usable length of about 2,400 feet. The runway is 140 feet wide, bushes to bushes, of which about 100 feet would be the runway proper, with about 20 feet on either side cleared of bushes. The surface is a mixture of sand and gravel, and there are a number of undulating areas along its length. There were several ruts approximately four inches deep near the west end that had been made by aircraft when the surface was soft. The airstrip ends at the top of an embankment overlooking a wide flat area between the airfield and a lake.

Tracks made by the aircraft's main wheels and nosewheel were easily discernible. The take-off roll began with the nosewheel cocked slightly to the right, and the direction of the roll was first to the right and then to the left of the runway centre line. Dirt was thrown first to the right and then to the left of the track made by the nosewheel.

An examination of the aircraft did not reveal any malfunction of the engines or airframe, nor did the investigation uncover any indication that a degradation in aircraft performance had contributed to the accident. The take-off weight of the aircraft was calculated to be approximately 13,300 pounds, about 800 pounds over the authorized maximum gross take-off weight of 12,500. The centre of gravity (C of G) was at 26.7 percent MAC, within the C of G limits of 26 to 36 per cent. No facilities to weigh the freight were readily available to the pilot, and his estimation of the take-off weight was in error.

The pilot had been flying for 14 years, the last nine with the RCMP, and he had two years experience on the Twin Otter. He had received his Twin Otter training from the pilot in charge of the Edmonton "Air" Section, and all training requirements as outlined in the Air Services Operations Manual were performed satisfactorily. This included training in short field take-off and landing (STOL) techniques and stressed the importance of not using nosewheel steering for directional control during a STOL take-off. However the pilot had not attempted nor practised a STOL take-off since his original check out on the Twin Otter.

The RCMP, as an operator of state-owned aircraft, is not required to hold a Canadian Transport Commission (CTC) licence, nor to comply with the specifications of an Operating Certificate (OC) issued by Transport Canada. There is no requirement for formal recurrent ground training and examination of the pilots, nor for annual pilot proficiency checks (PPC). Recurrent training as outlined in the Air Services Manual refers only to emergency procedure training. The responsibility to maintain currency on the aircraft remains with the individual pilot.

It could not be determined why the pilot did not abort the take-off when directional control was lost, nor later when the right wing contacted the runway followed by the left wing striking a shed.

ANALYSIS:

The trail made by the nosewheel indicates that the nosewheel was not centred at the start of the take-off roll, and dirt thrown up along the track was made by misuse of nosewheel steering, which can result in a loss of directional control. No attempt was made to abort the take-off when directional control was lost nor when the right wing struck the runway shortly after lift-off. Tail skid marks indicate the aircraft was lifted off in a nose-high attitude at a speed too low to sustain flight and in a direction that would take it off the side of the runway.

CONCLUSIONS:

Findings:

1. The pilot did not ensure the nosewheel was centred before starting the STOL take-off attempt.

2. The pilot's use of nosewheel steering contributed to the loss of directional control.

3. The pilot made no attempt to abort the take-off when directional control was lost.

4. The pilot had not attempted nor practised a STOL take-off since initial training on the Twin Otter.

5. The RCMP Air Services are not required to give formal recurrent ground training or PPCs to pilots operating Air Services aircraft.

6. The weight of the aircraft exceeded the maximum authorized take-off weight by approximately 800 pounds.

Causes:

Directional control was lost because of misuse of nosewheel steering early in the STOL take-off attempt, and no attempt was made to abort the take-off.

SAFETY ACTION:

Action taken:

In 1987, concerned over the frequency of occurrences involving RCMP aircraft, the Canadian Aviation Safety Board (CASB) conducted a review of such occurrences.

It was noted that four of the five accidents recorded between 1983 and 1986 were causally linked to pilot decision-making and judgement and that a number of generally accepted aviation practices and procedures, designed to enhance aviation safety, were absent from RCMP flight operations. Therefore, the Board directed that an Aviation Safety Advisory be forwarded to the RCMP Air Services suggesting, inter alia, that the RCMP obtain the services of an independent safety advisor to conduct a comprehensive safety audit of RCMP flight operations. Several measures were subsequently initiated to enhance the RCMP flight operations, including the recent enlistment of the assistance of Transport Canada to conduct a safety survey of the flight operations.

PROVINCE OF MANITOBA
CANADAIR CL215 C-GMAK
SASAGINNIGAK LAKE, MANITOBA
25 JULY 1989

BRIEF NUMBER: 89-C0147 (Accident)
LOCAL TIME: 1530 CDT
OPERATION: State
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	6,032	480
LAST 90 DAYS	150	150

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The aircraft, in use for fire suppression, was being taxied downwind on the lake to position for take-off. The aircraft was being taxied about 150 feet from the shoreline to avoid a known reef that could only be seen in the dark water out to about 20 feet from the shore. The aircraft rubbed over the submerged portion of the reef, and the hull was damaged. The damage did not prevent the aircraft from being flown out of the lake.

TRANSPORT CANADA
BEECHCRAFT A90 KINGAIR C-FCGI
MONCTON, NEW BRUNSWICK
14 AUGUST 1989

BRIEF NUMBER: 89-A0214 (Accident)
LOCAL TIME: 1015 ADT
OPERATION: State
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	7,016	600
LAST 90 DAYS	81	40

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

At approximately 800 feet above sea level, on initial climb out after take-off, the crew noticed a flock of birds ahead and above. The pilot levelled the aircraft to avoid the birds; however, the birds suddenly dove into the flight path, and one bird struck the aircraft on the radar dome. The radar dome was destroyed, and the forward bulkhead was substantially damaged. The bird was a three to four pound Cormorant.

INTERNATIONAL HELIFLIGHT
BELL 206B JET RANGER C-FDUV
CLOVERDALE, BRITISH COLUMBIA
23 JANUARY 1989

BRIEF NUMBER: 89-P0021 (Accident)
LOCAL TIME: 1545 PST
OPERATION: Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	4,200	500
LAST 90 DAYS	60	40

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

During an initial training flight, the instructor, flying from the left seat was demonstrating a landing in a field.

He did not complete the landing because of uneven ground and decided to move the helicopter to a more level area. As he increased collective and lifted the helicopter, he noticed the N2 droop, and he reached across the cockpit to the right-seat collective lever to adjust the rpm. While he was adjusting the rpm, a gust of wind raised the nose of the helicopter, and the tail rotor struck the ground. The pilot immediately attempted to land, and the helicopter came down heavily, bounced, and came to rest upright, 90 degrees to the right of the initial lift-off direction. Neither pilot was injured.

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VANCOUVER ISLAND HELICOPTERS LTD. HUGHES 369D (Helicopter) C-GPSX GOLD RIVER, BRITISH COLUMBIA 20 mi W 13 FEBRUARY 1989

REPORT NUMBER: 89-P0040 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1405 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,100	3,500
LAST 90 DAYS	140	104

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot was engaged in a slinging operation from a Canadian Coast Guard supply vessel positioned three miles offshore to a beach drop zone. He accepted a net loaded with plywood and slung it to the beach. He released the load, and the two nylon strap-type lanyard slings used to secure the net to the helicopter were attached in series to the aircraft's cargo hook. A swivel hook weighing about three pounds was attached to the end of the straps. On the return flight, the pilot climbed to 300 feet above sea level and accelerated to 90 knots. He noticed in the cargo sling mirror that the lanyards were whipping erratically in the slipstream. The airspeed was reduced to 70 knots, and the lanyards seemed to stablize. Shortly after, the pilot heard a loud "bang", and the helicopter immediately began rotating to the right. He lowered the collective control, rolled the throttle to flight idle, and entered autorotation. Part way through the descent, the helicopter, while continuing to rotate, pitched abruptly nose-down. The pilot countered with a full-aft cyclic control input and managed to level the helicopter just before water contact. The helicopter, which was not equipped with either fixed or emergency flotation equipment, rolled onto its left side when it touched down with some residual right yaw.

The pilot, who was not wearing a life-vest, was able to exit via the right door as the aircraft sank. A Canadian Coast Guard Bell 212 helicopter, also involved in the supply operation, rescued the pilot from the cold water within a minute of the ditching.

On recovery of the helicopter, both the tail rotor assembly and the lanyard were missing. No known deficiency was identified.

The lanyard totalled 17 feet in length, long enough to extend into the slipstream past the tail rotor. The first section was 10 feet long by 4.5 inches wide. The second was 7 feet long (including the swivel hook) by 1.5 inches wide. This lanyard configuration and load was initially intended for the larger Coast Guard helicopter; however, as the material was not heavy the pilot of the Hughes helicopter offered to transport it to the beach.

The flat-type lanyard is not approved for slinging by the operator of the occurrence aircraft because it is aerodynamically responsive to slipstream and tends to disturb the stability of a sling load. Non-stretch multi-braid nylon rope or steel cable is normally used by this operator.

A previous accident investigation (CASB Occurrence No. 87-P70060) found that flat-type lanyards in excess of 14 feet 3 inches can fly up into the tail rotor of a Hughes 369 at cruise speeds approaching 70 knots.

The pilot of the current accident had slowed down to stabilize the lanyards; however, the helicopter's airspeed of 70 knots remained sufficiently high to cause the flat-type lanyards to respond aerodynamically in the slipstream and fly up into the tail rotor blades. In the absence of any known mechanical deficiency, the investigation concluded that the tail rotor struck the lanyard, causing the tail rotor assembly to fail and separate from the aircraft. The loss of this assembly and the resulting forward centre of gravity shift account for the abrupt pitch nose-down experienced by the pilot during descent.

This operation involved repeated overwater flights with a helicopter that was not equipped with either a fixed or an emergency flotation installation, at an altitude that was too low to ensure a successful autorotation to the shore. The fortuitous quick rescue of the pilot, who was not wearing his life-vest, probably saved his life.

CONCLUSIONS:

Findings:
1. The pilot flew at a relatively high airspeed with two flat-type lanyards attached in series from the helicopter's cargo hook.

2. The flat lanyards flew back into the airstream and struck the tail rotor blades, causing the tail rotor assembly to separate from the aircraft.

3. The pilot, who was not wearing a life-vest, operated a helicopter that was not float equipped, at an altitude that precluded a successful autorotation to the shore.

4. The flat-type nylon lanyards are not approved by the operator for sling operations.

Causes:
The pilot flew with two flat-type lanyards attached in series to the cargo hook at an airspeed that caused the lanyards to fly up into the tail rotor.

VIKING HELICOPTERS LTD.
AÉROSPATIALE AS350B ÉCUREUIL
(Helicopter) C-GNML
VAL-JALBERT, QUÉBEC
24 FEBRUARY 1989

REPORT NUMBER: 89-Q0050 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1626 EST
OPERATION: Specialty Aerial Photography
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	6,215	1,490
LAST 90 DAYS	53	50

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	2	–

SUMMARY REPORT:

The helicopter was chartered to videotape a group of people on a snowmobile tour. During a low-level manoeuvre, the helicopter struck a high-tension hydro line and crashed. The three occupants were rescued by snowmobile riders. A Canadian Armed Forces helicopter, which was in the area, picked up a signal from the helicopter's emergency locator transmitter (ELT) and proceeded immediately to the site. The crew of the Armed Forces helicopter flew the seriously injured pilot and cameraman to the hospital. The aircraft maintenance engineer (AME) was taken to the hospital by ambulance shortly afterward.

The accident occurred on the first day of filming. The crew had never worked together before, and the work was not carefully planned. The itinerary was determined at the last minute by the cameraman/director, and the individuals involved did not have clearly defined roles.

The left doors of the helicopter were removed to permit uninterrupted filming. It was cold and all occupants were heavily clothed.

When he took off from the airport at 1412 eastern standard time (EST), the pilot had a very vague idea of what the operation entailed and what was expected of him. He landed one hour later at Val-Jalbert, Québec, after overflying the high-tension line that the helicopter later struck. He had to land several times during the flight to allow the occupants to warm themselves.

The cameraman/director said he wanted to film one last sequence of the snowmobiles on Lac Saint-Jean, a few kilometres east of Val-Jalbert. After they took off, around 1622 EST, he asked the pilot to follow the snowmobiles. The pilot complied, flying at low altitude and low speed.

The pilot was busy following the instructions of the cameraman/director, which were being relayed through the AME, and he did not see the high-tension line in time. When he realized that the helicopter's skids were caught on the first line, he pitched the aircraft and increased the collective pitch in an effort to disentangle the helicopter and avoid touching the other wires. The wire finally broke, and the helicopter tilted over the high-tension line and crashed onto its right side 240 feet away.

Neither the investigation nor the witnesses' statements revealed any malfunctions in the helicopter or its systems. The damage indicated that the rotors were still under power when ground impact occurred. The sky was clear, visibility was 20 miles, and the ambient temperature was about minus 20 degrees Celsius.

The pilot and AME said the occupants experienced discomfort because of the low temperature. They said their exposure to the cold for such a long period may have contributed to the accident.

During the last flight, the cameraman/director decided to remove his headset because it was cumbersome when he operated the video camera. He could no longer communicate directly with the pilot, so he had to communicate through the AME, usually by gestures. The AME relayed the instructions to the pilot by way of the head-

set and the on-board intercom or by gestures. On-board communications were clearly inadequate because the cameraman/director had removed his headset shortly after take-off.

At the time of the accident, the occupants had been exposed to very low temperatures for two and one-half hours, including one flight which lasted over an hour. After such a long period of exposure to the cold, even a relatively well-protected human body may not be able to perform normally, particularly on such a complex operation as low-level helicopter flight. In addition, the insidious nature of the effects of low temperatures make the symptoms hard to detect. The operation was not adequately planned before take-off. Moreover, as the pilot was busy following the instructions of the cameraman/director, he did not see the high-tension line in time to take evasive action.

CONCLUSIONS:

Findings:

1. The operation was not adequately planned before take-off.

2. Direct two-way communication between the cameraman/director and pilot was not maintained throughout the flight.

3. The pilot's in-flight performance may have been affected by exposure to temperatures at about minus 20 degrees Celsius for over two and one-half hours.

4. The pilot was busy following the cameraman/director's instructions and did not see the high-tension hydro line in time to take evasive action.

5. The pilot was unable to regain control of the helicopter and it crashed.

Causes:

The flight was carried out at low altitude although the operation was not adequately planned before take-off, and, during flight, the helicopter struck a high-tension hydro line.

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HIGHLAND HELICOPTERS LTD.
BELL 206B JETRANGER (Helicopter) C-GMGI
WILLIAMS LAKE, BRITISH COLUMBIA 5 mi E
16 APRIL 1989

REPORT NUMBER: 89-P0089 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1930 PDT
OPERATION: Commercial Non-Revenue
DAMAGE: Destroyed
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	8,913	8,000
LAST 90 DAYS	148	25

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	1	–	–

HISTORY OF THE FLIGHT:

The pilot of the helicopter and one passenger departed Williams Lake, British Columbia on a visual flight rules (VFR) positioning flight to their home at Knife Creek, 16 miles away. When they were five miles from their departure point at an altitude of about 400 feet above ground level (agl), a puff of smoke was observed to come from the engine exhaust. The aircraft then descended until it struck tall trees on a hillside at an elevation of 2,550 feet above sea level. The two occupants were fatally injured, and the aircraft was destroyed in an intense post-crash fire.

PERTINENT INFORMATION:

The cool clear weather was not a factor in this accident. The pilot was highly experienced flying the Bell 206 and was familiar with the terrain, having worked and lived in the area for a number of years. The pilot flew the most direct route home which took him over a ridge covered with tall trees. Within one mile of the crash site, there were numerous landing sites where a safe autorotational landing could have been carried out. To reach these sites, the autorotating helicopter would have had to have been flying about 1,000 feet higher or be one-half mile north of the direct track flown.

The investigation revealed that the engine had suffered a catastrophic failure in the compressor section, causing a complete and sudden power loss. The damage to the compressor was consistent with a second stage stator vane failure, but, because of the extensive rubbing damage, this could not be positively confirmed. The most likely mode of failure would be fatigue, the nature of which could not be established. The failed compressor

section had been overhauled four years previously, at a total time since new (TTSN) of 3,403.9 hours and total cycles since new (TCSN) of 5,173. At this time, an overhauled compressor case with stator vanes of unknown TTSN was installed with a new compressor rotor assembly. Since that time, the compressor had accumulated 1,767.4 hours, approximately half of its approved 3,500 hours between overhauls. The compressor case halves had been disassembled and the compressor inspected 115 hours prior to the crash. There had been no defects noted at that time. The aircraft was maintained in accordance with existing approved procedures.

A review of the Canadian Service Difficulty Reporting System revealed that, in the United States and Canada, there have been approximately 40 cases of compressor failure due to a stator vane or rotor blade failure. In approximately two-thirds of these cases, the source of failure was either the second stage rotor blades or the third stage stator vanes or rotor blades. The compressor on this engine has six stages.

ANALYSIS:

When the engine failed, the helicopter was at low level over a heavily wooded ridge with no suitable landing sites within autorotational distance. The choice of a higher altitude or a somewhat less direct route would have given the pilot a suitable site to land on in case of engine failure. It is likely that, because of the short distance to be flown and with no thought of an engine problem, the pilot did not exercise these options.

The engine failure was traced to the compressor section where analysis determined the most likely cause to be a second stage stator vane failure due to fatigue. Neither could be established with certainty due to the smearing of the fracture surfaces as the engine ground to an abrupt stop.

CONCLUSIONS:

Findings:
1. The compressor failed most likely due to fatigue of a second stage stator vane.

2. Following the instantaneous engine failure, the helicopter was too low to autorotate to a suitable landing site.

Causes:
The compressor failed, most likely due to fatigue of a second stage stator vane. The helicopter was over a heavily wooded ridge, and the pilot was unable to carry out a successful autorotational landing.

SAFETY ACTION:

Action taken:
Subsequent to a previous Allison 250 C20 engine failure (CASB 86-P64088 refers), Transport Canada issued Service Difficulty Advisory (AV-88-02 dated 1988 04 22) which strongly recommended that operators incorporate a minimum thickness inspection of the stator vanes of the compressor. In addition, in response to a CASB Aviation Safety Advisory dated 07 July 1989, Transport Canada issued Service Difficulty Advisory (AV-89-14 dated 1989 11 23). This Advisory recommended that the compressor be inspected at least every 300 hours in accordance with the Allison Operating and Maintenance Manual and be given a daily water rinse in corrosive environments.

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RAINBOW HELICOPTERS INC.
HUGHES 369HS (Helicopter) N9238F
NIAGARA FALLS HELIPORT, ONTARIO 1/2 mi NE
30 MAY 1989

REPORT NUMBER: 89-O/0238 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1800 EDT
OPERATION: Specialty Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	600	200
LAST 90 DAYS	100	100

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

SUMMARY REPORT:

The pilot departed Goat Island, New York under visual flight rules (VFR) on a tour flight of Niagara Falls. While flying northbound at ridge level in the Niagara River gorge, the helicopter flew into downflowing air and descended in the vicinity of the Whirlpool. The pilot arrested the descent and planned to climb when the helicopter struck an aerial car support cable. Control was momentarily lost, and the cable tore the skid gear from the fuselage. The pilot made a forced approach to a golf course and hovered to allow the passengers to exit before landing. The helicopter touched down on the fuselage and tail skid and remained upright.

The aerial car support cables span 1,781 feet from Colt's Point Terminal to Thompson's Point Cave at approxi-

mately 18 feet below the gorge ridgeline and are unmarked. The cable car was approximately 150 feet from the terminal, returning with 17 passengers on board, when the helicopter struck the cable 689 feet from the terminal. The cables swayed and galloped as the cable car was slowly brought into the dock. None of the cable car passengers sustained any injury. A weather observation at St.Catharines Airport indicated that the surface winds were from 230 degrees at 12 knots and the temperature was 25 degrees Celsius. Given these conditions in the Niagara area, downflowing air could have existed in the vicinity of the river gorge.

Examination of the helicopter revealed that both forward strut feet, which provide landing gear struts to skid attachment, had been severed. Both rear landing gear strut assemblies, the left gear damper, and both skid tubes were missing. The horizontal stabilizer had an outboard puncture through both skin surfaces, and the right forward strut brace had ruptured the fuselage belly skin. Although the main rotor and tail rotor blades were undamaged, the power train would not rotate backwards for undetermined reasons.

The pilot regularly flew tour flights around the falls; however, he had only flown to the Whirlpool area on one previous occasion and had not visually inspected the river gorge for hazards. The Niagara Falls VFR Terminal Procedures Chart in the Canada Flight Supplement and the Northeast Volume Airport Facility Directory in the United States recommends for helicopters that a right-hand racetrack pattern be flown at an altitude of 2,000 to 2,200 feet above sea level (asl) in the falls area. The Niagara Falls VFR Terminal Procedures Chart and the local Air Navigation Charts do not identify the cables. The pilot operated the helicopter at approximately 560 feet asl while flying at ridge level.

Because the aerial car support cables were not identified on navigational charts or visually marked, the pilot was not made aware that the cables existed. However, had the pilot visually inspected the river gorge from above for hazards and/or abided with the recommended altitudes and procedures, the cable strike could have been prevented.

CONCLUSIONS:

Findings:
1. The pilot operated the helicopter within the river gorge without prior inspection for hazards and was unaware that the aerial car support cables existed.

2. The cables were not visibly marked or indicated on navigational charts.

3. The pilot did not see the aerial cable car or car support cable.

4. The possibility of downflowing air in the vicinity of the river gorge existed.

5. The pilot flew below the recommended minimum altitude.

Causes:
The pilot did not inspect the river gorge for hazards and flew into an aerial car cable support.

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PRECISION HELICOPTERS INC.
BELL 206B JETRANGER (Helicopter) C-GVIJ
GRANDE PRAIRIE AIRPORT, ALBERTA
09 JUNE 1989

REPORT NUMBER: 89-W0112 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1616 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	2,707	360
LAST 90 DAYS	91	91

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	1	2

SUMMARY REPORT:

The helicopter was approximately 50 feet above ground level on a short final for a landing when the pilot experienced a loss of main rotor rpm. The pilot attempted an autorotation, and the helicopter landed heavily on the ramp. As the four occupants exited the aircraft, the aircraft maintenance engineer, who was also a passenger, realized the engine was still operating at a reduced rpm. He turned off the fuel valve to shut down the engine. The four occupants were doused in jet fuel from the ruptured fuel tank and were taken to the local hospital for treatment. There was no post-crash fire.

The pilot's first indication of the problem was a low rotor rpm warning horn and warning light. While checking that the throttle was fully open, the pilot noticed that there was no "engine-out" warning horn or light on. The rotor rpm warning system activates at 90 + 3 per cent rotor rpm (Nr). The engine-out system activates when the engine tachometer (N1) reaches 55 + 3 per cent. A

post-crash inspection confirmed that both systems functioned normally for the type.

An examination of the helicopter, including the engine and all drive systems, failed to reveal the reason why the engine rpm dropped from flight rpm to an rpm somewhere above 55 per cent.

The engine (Detroit Diesel Allison 250C20B) was removed from the helicopter and run up to full operating power and rpm in a test cell. Several quick throttle reductions were carried out in an attempt to induce the engine to decelerate and to determine why the engine had decelerated. No faults were found, and the engine was capable of producing rated power. Fuel samples taken from the engine components were analysed and found to be the correct grade of aviation fuel. An inspection of the airframe fuel filter showed that it was clean and in good condition. The airframe fuel boost pumps were tested and found to operate normally for the type. An examination of the aircraft's maintenance log books showed no outstanding maintenance discrepancies that could have contributed to the engine deceleration.

Throughout the years, there have been several unexplained decelerations of the Allison 250 series engines. Bell Helicopters, Detroit Diesel Allison, and several other parties have carried out studies in an attempt to determine the reason for these decelerations. The frequency of decelerations have been declining over the past ten years. The cause of this engine deceleration could not be determined.

All of the occupants suffered some degree of injury or discomfort to their backs as a result of high vertical deceleration forces. The rigid metal seats, covered with little or no crushable material, would contribute to this type of injury.

The collapsing of the cross tubes, along with the deformation of the lower portion of the fuselage directly below the rear cabin seat, resulted in torn metal and a severely ruptured fuel tank. The resultant fuel spray doused all occupants in the aircraft.

When the engine rpm malfunctioned, it did not decelerate low enough to activate the engine-out warning system. The first warning the pilot had was when the low main rotor rpm warning activated. By this time, the main rotor rpm had dropped below 90 per cent. By the time the pilot entered an autorotation, he was too low to recover the rpm and prevent the aircraft from striking the ground with a high rate of descent.

CONCLUSIONS:

Findings:

1. The engine decelerated for undetermined reasons.

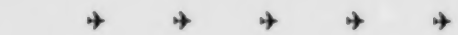
2. The pilot was at a low altitude prior to taking the necessary corrective action.

3. The occupants in the aircraft were doused with turbine fuel when the fuel tank ruptured on impact.

4. All the occupants suffered some form of back injury or discomfort caused by the high vertical descent rate.

Causes:

The helicopter engine decelerated for undetermined reasons.



BELL 206B JETRANGER (Helicopter) C-GTZB
RAMORE, ONTARIO 1.5 mi NE
19 JUNE 1989

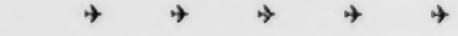
BRIEF NUMBER: 89-O/0272 (Accident)
LOCAL TIME: 1415 EDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	12,500	10,000
LAST 90 DAYS	–	175

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

The pilot was demonstrating a touch-and-go landing in a confined area. During the take-off, the helicopter skid snagged a fence wire hidden from view in the grass. To prevent the helicopter from rolling over, the pilot landed it heavily on the left skid. The helicopter was substantially damaged by the heavy landing.



LES HÉLICOPTÈRES ABITIBI LTÉE
BELL 204 (Helicopter) C-GAPJ
LG2, QUÉBEC 100 mi NE
14 JULY 1989

REPORT NUMBER: 89-Q0202 (Accident)
INFORMATION SOURCE: Office Investigation
LOCAL TIME: 1640 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Helicopter

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	12,000	300
LAST 90 DAYS	124	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The purpose of the flight was to pick up survey crews. The pilot was hovering about five feet above ground level (agl) when a plastic tarpaulin contacted the tail rotor. The helicopter rotated 90 degrees to the right before the pilot could set it down. The pilot was uninjured; the helicopter suffered substantial damage.

At the time of the accident, the winds were from the northwest at 10 knots and visibility was reported to be more than 15 miles.

The pilot was qualified on type, and weight and balance of the helicopter were within prescribed limits.

Construction of the landing area was not completed, and space was limited. There was no temporary helipad and no buildings to store the equipment required for this type of operation. The equipment was placed in boxes on the ground and covered with plastic tarpaulins to protect it from the elements. Fuel drums were also placed along the edge of the landing area.

On the morning of the accident, a tent was delivered to the site to store the equipment, and work crews began to tidy up the landing area. During the pre-flight inspection, the pilot did not notice that a plastic tarpaulin had been left on the site. The tarpaulin flew up and was sucked into the tail rotor, causing the tail rotor transmission shaft to fail.

The landing area had not been prepared, and a plastic tarpaulin had been left between the fuel drums by the aircraft maintenance engineer (AME) who thought it was sufficiently restrained. The pilot did not see the tarpaulin during the pre-flight inspection. It is the pilot's responsibility to ensure that the area to be used is suitable for the intended operation. Shortly after take-off, a plastic tarpaulin was sucked into the tail rotor. The helicopter rotated 90 degrees before the pilot could set it down.

CONCLUSIONS:

Findings:
1. The landing area was not prepared, and some debris, including a plastic tarpaulin, was on the ground.

2. During the pre-flight inspection, the pilot did not see the plastic tarpaulin near the helicopter.

3. On take-off, the plastic tarpaulin was sucked into the tail rotor.

4. The helicopter made a 90-degree rotation, and the pilot set the helicopter down.

Causes:
The pilot did not ensure that the take-off area was suitable and clear of obstacles for take-off.

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SCAN AVIATION LTD.
BELL 206B JETRANGER (Helicopter) C-FJSL
WATSON LAKE, YUKON 40 mi N
18 JULY 1989

BRIEF NUMBER: 89-W0158 (Accident)
LOCAL TIME: 1920 PDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	7,924	2,308
LAST 90 DAYS	67	67

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The pilot landed to enable his passenger to drop off a water pump at a fire. The passenger exited the helicopter, and moved to the rear of the aircraft to remove the cargo from the rear compartment, then returned. The aircraft lifted off and was in cruise flight when the pilot felt a severe vibration coming from the rear of the aircraft. A successful precautionary landing was completed on a river bank.

Examination of the aircraft revealed that the rear cargo compartment door was open, a nylon jacket was missing, and there was damage to the tail rotor blades. Apparently, the jacket fell out of the aircraft, because the cargo door was left open or unlocked, and struck the tail rotor.

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NORTH CENTRAL HELICOPTERS LTD.
BELL 206A JETRANGER (Helicopter) C-GEDE
SANDY BAY, SASKATCHEWAN 36 mi W
21 JULY 1989

BRIEF NUMBER: 89-C0141 (Accident)
LOCAL TIME: 1315 CST
OPERATION: Aerial Control
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	530	166
LAST 90 DAYS	155	155

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

The pilot was performing fire support duties in the Eisler Lake area, 36 miles west of Sandy Bay, Saskatchewan. A landing was executed to a small, log helicopter pad on the edge of a small lake, to drop off one firefighter and some equipment. Before the helicopter was secure on the pad and before he brought the collective fully down, the pilot turned his head to the right to observe the removal of the equipment from the back seat. At this time, the front-seat passenger jumped out of the helicopter; the nose came up, and the helicopter slid backwards on the logs. The back of the skids (and bear paws) slid under the last log, and the tail rotor was pushed into the mud and water on the edge of the lake. After the engine was shut down, the pilot found the tail rotor drive shaft sheared, the tail rotor buried in the mud, and main rotor blade strikes on the tail rotor tunnel.

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NORTHWESTERN HELICOPTERS LTD.
SIKORSKY S-58D (Helicopter) C-FEWH
LAVENDER LAKE, SASKATCHEWAN
22 JULY 1989

REPORT NUMBER: 89-C0143 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1955 CST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	5,075	55
LAST 90 DAYS	80	55

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	2

HISTORY OF THE FLIGHT:

The pilot was using the helicopter to transport groceries and supplies to fire-fighting camps in the area. He had just completed two supply drop-offs and was en route to the camp at the Brabant fire. The pilot had established cruise flight, 2,200 feet above ground level (agl), when he noticed a sudden reduction in engine power. He immediately lowered the collective but was unsuccessful in restoring the engine power, and, shortly thereafter, the red engine chip light illuminated. The pilot scanned the area for a suitable landing site, noticed a marshy clearing at a creek entrance into Lavender Lake, and brought the helicopter around over the lake into wind. He headed toward the marshy clearing and settled the helicopter down into the water, about 30 feet from the shoreline. The pilot was not able to fully arrest the forward speed, and the helicopter pitched forward. The main rotor blades struck the water, and the helicopter rolled over onto its right side. The helicopter came to rest in about three feet of water, and the pilot and two passengers exited uninjured. The pilot activated the emergency locater transmitter (ELT), and he and his passengers were picked up a short time later.

PERTINENT INFORMATION:

The helicopter was converted from a military model HUS-1/H34D to a civilian Model S-58D in November 1981 and was imported into Canada from the United States in April 1989. The helicopter underwent an intensive Inspect, Test, Repair as Necessary (ITRAN) inspection and received a Canadian Certificate of Airworthiness on 16 June 1989.

Transcriptions in the Canadian log books show that an overhauled Curtis Wright 989C9HE2 (R-1820) engine was installed in January 1985 and had accrued approximately 176.0 hours in service since installation. During its time in service, the cylinders were removed, overhauled, and re-installed with new piston rings. No history could be found on the date of the engine overhaul or the engine's total time since new (TTSN).

The engine was removed from the helicopter for teardown analysis. The engine teardown revealed that the supercharger impeller drive fluid coupling shaft had failed at the oil holes beneath the pinion gear (see Appendix A). The forward end of the shaft showed signs of overheating. Both the front and rear bushings were badly worn, and the front bushing had rotated in the supercharger rear housing and had sheared the bushing retainer pin. The pinion gear, mounted on the rear portion of the impeller drive fluid coupling shaft, had badly worn and damaged gear teeth. The impeller drive gear was cocked and had worn a hole through the supercharger rear housing.

ANALYSIS:

The most probable cause of the engine power loss was a blockage of oil to the supercharger impeller drive fluid coupling shaft front bushing. Friction between the shaft and bushing forced the bushing to rotate in the supercharger rear housing and caused the bushing retaining pin to shear. When the bushing rotated, the oil supply to the shaft was completely cut off, causing the shaft to overheat and the front bushing to wear. The increased clearances induced a vibration in the shaft which caused the rear shaft bushing to wear and the pinion gear and the pinion drive gear to misalign. The pinion gear teeth were damaged, and a load was placed on the fluid coupling shaft. The shaft suffered an overload fracture at the oil holes beneath the pinion gear and allowed the supercharger impeller drive gear to cock and wear a hole in the supercharger rear housing.

When the bushing rotated, the oil pressure supply to the supercharger impeller drive fluid coupling was also cut off. With no oil pressure available to maintain its hydraulic coupling action, the supercharger was decoupled. With the supercharger decoupled, the power output of the engine was reduced to that of a normally aspirated engine. The power output of the engine was further reduced by a now excessively rich mixture coupled with oil that was entering the diffuser case and combustion chamber through the hole cut in the supercharger rear housing.

The cause of the oil blockage to the supercharger impeller drive fluid coupling shaft front bushing could not be determined.

CONCLUSIONS:

Findings:

1. The supercharger impeller drive fluid coupling shaft front bushing rotated in the supercharger rear housing.

2. Rotation of the bushing starved the supercharger impeller drive fluid coupling of oil which effectively decoupled the supercharger and reduced the power output of the engine to that of a normally aspirated engine.

3. The supercharger impeller drive fluid coupling shaft failed in overload and allowed the impeller drive gear to contact and wear a hole through the rear supercharger housing.

4. Oil entered the diffuser case and combustion chamber through the hole cut in the supercharger rear housing and further reduced the engine power.

Causes:

The most probable cause of the engine power loss was a blockage of oil to the supercharger impeller drive fluid coupling shaft front bushing. The cause of the oil blockage could not be determined.

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ORIOLE AIR LTD.
ROBINSON R22 BETA (Helicopter) C-GPAR
WANDERING RIVER, ALBERTA 5 mi N
07 SEPTEMBER 1989

REPORT NUMBER: 89-W0222 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1020 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	3,100	2,200
LAST 90 DAYS	200	25

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The helicopter was flying down a pipeline right-of-way conducting a survey which involved landing at various unprepared sites to check monitoring equipment. At each site, the pilot selected a landing spot near the site, and the technician exited the helicopter and took his measurements. At this particular site, the pilot located a

log which he thought might be an appropriate landing spot. As the helicopter touched down on the log, the pilot realized that the site was unsuitable and decided to lift off to locate another site. As the helicopter was lifting off, the tip of the left skid tube hooked a rail from an abandoned piece of machinery, and the helicopter tipped forward. The pilot reacted by pulling back on the cyclic control. The main rotor blades contacted the tail boom and severed the tail rotor drive shaft which allowed the aircraft to pivot to the right. The skid tube broke, and the helicopter continued to turn coming to rest on its left side. Both occupants were wearing shoulder harnesses and escaped uninjured.

There were no pre-impact mechanical descrepancies apparent nor were any reported prior to the incident. The weather at the time of the occurrence was not a factor.

The rail was camouflaged entirely by tall grass and had appeared to have been there for a considerable length of time. As the pilot was lifting off from the log, the nose of the helicopter dropped down and forward, allowing the left skid tube to slip under the rail. When helicopter tipped forward because the skid was caught on the rail, the pilot reacted by pulling back on the cyclic. The correct procedure would have been to stop the movement by lowering the collective control and then level the helicopter with the cyclic control. When the critical roll over angle was exceeded, the helicopter continued to tip forward, and no amount of control input could have arrested this movement.

The pilot did not ensure the skids were free of any obstacle before attempting to lift off.

CONCLUSIONS:

Findings:

1. As the pilot was lifting off from the log, the helicopter dropped down and forward, and the left skid tube slipped under the rail.

2. The main rotor blades contacted the tail boom, causing the tail rotor drive shaft to be severed.

3. The pilot did not use the proper technique to stop the initial forward movement of the helicopter.

4. Both occupants of the helicopter were wearing shoulder harnesses and were uninjured.

Causes:

The pilot did not ensure the skids were clear of any obstacle before attempting to lift off.

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AIR MUSKOKA
HUGHES 369HS (Helicopter) C-GCXK
MUSKOKA AIRPORT, ONTARIO 6 mi E
15 SEPTEMBER 1989

BRIEF NUMBER: 89-O/0455 (Accident)
LOCAL TIME: 1810 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,717	700
LAST 90 DAYS	206	206

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

While returning to base, the pilot elected to carry out a practice autorotation in preparation for an upcoming pilot proficiency ride. The helicopter touched down hard, and the main rotor blade struck the tail boom. The helicopter was substantially damaged.

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HÉLI-LITTORAL
BELL 206 JETRANGER (Helicopter) C-FDXZ
LA ROMAINE, QUÉBEC
27 SEPTEMBER 1989

BRIEF NUMBER: 89-Q0275 (Accident)
LOCAL TIME: 1350 EDT
OPERATION: Specialty Aerial Ambulance and Mercy
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	541	541
LAST 90 DAYS	324	324

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES

When the ski-equipped helicopter encountered a snow shower en route, the pilot made a precautionary landing in a marsh. About 10 minutes later, when the visibility had improved, the pilot decided to resume the flight. The wind was from the right at 30 to 40 knots. On take-

off, the helicopter pitched back, the tail rotor struck the ground, and the aircraft tilted to the left and came to rest. The helicopter was substantially damaged, but the pilot was uninjured. Later, the pilot realized that the rear portion of the left skid had sunk in the boggy ground during the precautionary landing.

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TUNDRA HELICOPTERS LTD.
BELL 206B (Helicopter) C-FTHL
TOP OF TOBA INLET, BRITISH COLUMBIA
09 NOVEMBER 1989

BRIEF NUMBER: 89-P0297 (Accident)
LOCAL TIME: 1030 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	420	90
LAST 90 DAYS	160	10

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was landing the helicopter in a confined area near a fuel cache to refuel. He terminated the approach in a high hover, and, after he verified tail rotor clearance, he descended vertically and landed. The helicopter was blocking a logging road so the pilot took off and, in a low hover, moved a few feet to a new site on sloping ground. Satisfied with the location, he touched down with the left skid on the high side of the slope. The helicopter began to lean to the right, and the pilot applied left cyclic control to compensate. However, his left leg jammed between the collective control and the cyclic control, limiting the lateral travel of the cyclic control; as a result, the helicopter continued to tilt to the right, and its main rotor struck a fuel drum. The helicopter rolled over onto its right side and was substantially damaged; the pilot received minor facial injuries.

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HIGHLAND HELICOPTERS LTD.
BELL 212 (Helicopter) C-GMUJ
TENDERFOOT MOUNTAIN, BRITISH COLUMBIA
08 FEBRUARY 1990

BRIEF NUMBER: 90-P0043 (Accident)
LOCAL TIME: 1330 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	9,876	1,552
LAST 90 DAYS	96	96

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	3

REPORTED CIRCUMSTANCES:

During the approach for a landing at a repeater-site on Tenderfoot Mountain, the helicopter pilot noticed that the landing reference marker was covered with snow. He pulled up, and as the loose snow began to swirl, he turned toward a nearby rock face for visual reference and entered a hover. Because a cloud moved, in closing off his escape route, the pilot asked a passenger to throw out a stake for visual reference, and proceeded to land. As the helicopter came within two feet of the surface, the main rotor blades made contact with the rock face. The pilot lowered the collective, and the helicopter settled into the soft snow in an upright attitude. There were no injuries; the helicopter was substantially damaged.

The pilot stated that the stake used as a landing reference was located too close to the rock wall.

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RIVERSIDE HELICOPTERS LIMITED
HUGHES 369 D (Helicopter) C-GQAE
DELTA AIR PARK, BRITISH COLUMBIA 1 mi E
03 MARCH 1990

BRIEF NUMBER: 90-P0076 (Accident)
LOCAL TIME: 1250 PST
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	N/A	N/A
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The training flight was undertaken to provide the second-in-command pilot with the instruction required for endorsement on the Hughes 369 D helicopter type. To simulate a tail rotor control malfunction on approach for landing the pilot-in-command held constant right pedal control input throughout the descent. To eliminate excessive yaw, a low power, steep approach was established. Immediately prior to touchdown, the pilot flared the helicopter to a nose-high attitude to reduce the forward speed and descent rate. As the collective was raised to cushion the landing, the pilot rolled the throttle off slightly to maintain directional control. On touchdown, the rear of the skids contacted the ground, and the aircraft pitched nose down. The main rotor, which was inclined rearward, struck and severed the tail boom. The landing area used was a tidal flat, and the crew had anticipated that the skids would tend to slide over the surface more readily than was experienced.

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BELL 206B (Helicopter) JETRANGER III C-FIPH
CARDINAL, ONTARIO 2 nm N
10 MAY 1989

REPORT NUMBER: 89-O/0206 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1253 EDT
OPERATION: Private Company Business
DAMAGE: Destroyed
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	13,410	7,500
LAST 90 DAYS	85	85

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	–	–	–

HISTORY OF THE FLIGHT:

The pilot departed his overnight location at South Bend, Indiana at approximately 0605 eastern daylight time (EDT) and flew a non-stop pipeline patrol to London, Ontario. He cleared Canadian customs and refuelled before proceeding with the designated line patrol to Toronto and Montreal. His next destination was Kingston, where he ate lunch and refuelled. Shortly after 1215 EDT, the pilot departed the Kingston area for Montreal. At 1253 EDT, Ontario Hydro experienced a major power interruption in the Ottawa region. An Ontario Hydro helicopter was dispatched to conduct an airborne search for the cause of the power outage. This search located the wreckage of C-FIPH close to broken high tension power lines. The pipeline pilot was fatally injured in the accident.

PERTINENT INFORMATION:

The weather at the time was good visual conditions. The visibility was 15 miles, the temperature was 13 degrees Celsius, and the sky condition was 1,700 feet broken. The wind was from the southwest at 11 knots.

The pilot had been employed with the company for 10 years and held the position of Chief Pilot for rotary wing. He held a commercial licence with a valid Class I instrument rating for helicopters and multi-engined aeroplanes (land and sea). The pilot was type-endorsed for 11 helicopters and held a valid Class I helicopter instructor rating. Since 1977, he had annually attended a 206B Transition Flight Training Course at the manufacturer's training centre in Fort Worth, Texas. Three weeprior to the accident, the pilot completed a training ride at Canadore College in North Bay, Ontario which involved emergency procedures and operational manoeuvres. He

had also completed a Mountain Recurrent Training Course 39 weeks prior to the accident. Comments in the remarks portion of the pilot's training records described the pilot as "an excellent pilot", "a knowledgeable and professional pilot", "current on type with a high level of competency both in operational flying techniques and emergency procedures", "a pleasure to fly with", "an outstanding pilot in all areas" who "displayed exceptional judgement and skill."

The average flying time that the pilot had flown for 1989 while doing the solo pipeline patrols was 4.6 hours per day. The average flying time he had flown during the last two and one-half days was 9.8 hours per day.

The company had scheduled the pilot to fly the entire pipeline patrol over a five-day period, but he intended to do the patrol in three days returning home two days early. The pilot departed Toronto, Ontario on 08 May 1989 at 1000 EDT and finished his flying for the day 9 hours and 15 minutes later in Duluth, Minnesota. He departed Duluth at 0830 the following morning and finished his flying for the day 12 hours and 15 minutes later in South Bend, Indiana. On 10 May 1989, the pilot departed South Bend at 0605 in the morning and made two stops prior to the accident. The first was in London for customs and fuel which took 26 minutes until he was airborne again. The second was in Kingston for fuel and food which took 30 minutes until he was airborne. People who knew the pilot reported that he looked fatigued and that he had commented on how tired he was. It was reported that he did not sleep well in hotel rooms. It could not be determined how much actual sleep time the pilot had in the last three days.

The pipeline right-of-way and high tension power lines ran through a level, swampy, wooded area. The high tension power lines were located approximately 500 feet north and parallel to the pipeline on a magnetic heading of 060 degrees.

Six hours and 43 minutes after departing South Bend, the helicopter struck the tops of three groups of trees (one to two trees per group) approximately 30 feet high, over a distance of 300 feet, prior to striking the high tension power lines at 54 feet above ground level. Pieces of acrylic plastic from the chin bubble and paint chips were found along the trail near the base of the trees. The profile of the flight path, indicated by breaks in the trees, showed a gradual descent with a steep pull-up at the last group of trees 53 feet from the power line. The helicopter struck the lower south power line and ascended through the lines exiting at the top north power line. Four out of the six power lines were marred (two severed, two damaged). The main wreckage struck the ground tail first and came to rest 319 feet from the first contact with the power line. It laid in a thicket-laden bog partially submerged in two feet of water. The emergency locator transmitter (ELT) did not activate because the impact angle and direction did not impose forces on the ELT sufficient for activation.

The helicopter suffered catastrophic damage as a result of the power line strike and subsequent crash. Parts and pieces of the helicopter were strewn along the 769-foot wreckage trail on a heading of 020 degrees magnetic.

The wreckage was recovered and transported to the CASB Engineering Laboratory. Examination and disassembly of the helicopter and certain components were carried out by the CASB staff and representatives of the manufacturer. Functional testing of the flight control servos initially indicted a fault in the collective servo. Subsequent examination determined the fault was related to impact damage. All major components of the aircraft were identified and examined to the degree possible; no evidence of a malfunction was found.

The aircraft was equipped with a Bristol Aerospace Limited Wire Strike Protection System (WSPS). The upper wire cutter was found to have the paint removed along its cutting edge. The northernmost one-inch-diameter top high tension line was found to have been cut by the wire cutter.

The radio altimeter was examined and found set to provide altitude alert notification, both aural tone and indicator light, at an altitude of 50 feet above ground level (or other surface).

The helicopter was equipped with Loran with waypoints entered to carry out the pipeline patrol and alert the pilot of the location of obstacles in his flight path (hydro lines crossing the pipeline right-of-way, towers, etc.) In this instance, the hydro line paralleled the pipeline and thus was not entered.

The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.

The helicopter's weight and centre of gravity were within the manufacturer's prescribed limits. The company provided flight helmets for helicopter crews, but the pilot was not using one at the time. The pilot did not have an observer or second pilot to help relieve the workload.

Full autopsy and toxicological testing did not reveal any evidence of impairment that would have affected the pilot's performance.

The progressive decrement in performance ability due to prolonged or extreme mental or physical activity, or sleep deprivation is called fatigue. Stresses such as noise, vibration, flicker, wearing effects of psychosocial

problems, backache, and thermal stresses contribute to fatigue. Proper rest and diet are important in the prevention of fatigue.

ANALYSIS:

The helicopter systems were examined to the degree possible, and no evidence of a malfunction was found. The autopsy and toxicology reports revealed no physical anomalies or impairments. The activities required to prepare for the start and end of the day, which would diminish the rest/sleep period, must be taken into consideration. The pilot increased his workload by condensing his flying schedule from five days to three. Flying at extremely low levels imposes a heavy workload on a pilot, not only mentally but physically. The "inspection" portion of the job is an additional duty and strain to the actual piloting. Fatigue is the natural result of continuous exposure to this environment and proper periods of rest are required to recuperate.

The profile of the flight path, indicated by breaks in the trees, showed a gradual descent with a steep pull-up at the last group of trees 53 feet from the power line. This flight path is consistent with a pilot's falling asleep and the helicopter beginning a gradual descent into tree-tops. There is no other plausible explanation. On impact with the trees, the pilot would have awakened disoriented. His most likely reaction would be to immediately pull up to avoid further tree strikes. However, the helicopter struck the high tension hydro lines immediately ahead. Radio altimeter alerting would not have occurred until the helicopter left the cleared pipeline right-of-way and flew over the trees.

CONCLUSIONS:

Findings:

1. The pilot had been on duty an estimated 20 hours in the past two days and was known to be tired.

2. The helicopter deviated from the pipeline right-of-way and began a shallow descent.

3. The helicopter struck tree-tops, climbed abruptly into a power line, and crashed to the ground.

4. The pilot increased his workload to finish the pipeline patrol two days ahead of schedule.

5. The pilot did not have an observer or second pilot to help relieve the workload.

6. The pilot was not wearing a protective helmet.

7. The helicopter systems were examined to the degree possible, and no evidence of a malfunction was found.

8. The pilot was licensed and qualified to conduct the flight in accordance with existing regulations.

9. The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.

10. The aircraft weight and centre of gravity were within the prescribed limits.

11. The ELT did not function because the impact forces were not great enough to cause activation.

Causes:

The helicopter struck trees and a power line probably as a result of pilot fatigue.

ENSTROM F28C (Helicopter) C-GUMG
BRAZZA LAKE, QUÉBEC
23 MAY 1989

REPORT NUMBER: 89-Q0125 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0715 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
LICENCE: Private Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	494	494
LAST 90 DAYS	3	3

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	1	–	–

HISTORY OF THE FLIGHT:

The pilot and passenger were on a fishing trip which was to last a few hours. Because the weather deteriorated rapidly, the pilot was unable to leave the fishing camp until three days later. Shortly after take-off, he encountered bad weather, so he decided to turn back and land on Brazza Lake, about three kilometres south. During the upwind landing, the helicopter yawed sharply to the right, the main rotor touched the surface of the lake, and the helicopter overturned. The floats held the helicopter at the surface. The pilot exited the cabin through the right door, but, despite several attempts, he was unable to rescue the passenger.

PERTINENT INFORMATION:

Weather conditions on take-off were favourable for visual flight rules (VFR) flight. The sky was overcast and the ceiling was about 1,300 feet. The pilot and witnesses reported that visibility was at least five miles and that the winds were from the northwest at seven knots, forming small waves on the surface of the lake.

The helicopter was operating normally before impact, and the loss of control was not caused by a deficiency in any of its mechanical systems or components. The helicopter was not equipped with full dual controls, but it had rudder pedals on the passenger's side.

The pilot had owned the helicopter since 1977. His licence had expired eight months before the accident, because he had not undergone the mandatory annual medical examination. He had had no regular in-flight training on his helicopter in about two years, nor was he required to do so.

The pilot said he intended to go back and land at the outfitter's camp because of the uncertain weather conditions in the mountainous region south of Brazza Lake. He turned around just after entering a cloud layer, and he observed that visibility outside the cockpit was considerably reduced by mist and condensation on the bubble.

As a precautionary measure, the pilot decided to land on the lake and allow the bubble to clear completely before landing at the outfitter's camp. He said that during the approach to the lake, he could clearly distinguish the shore about 200 feet from the water landing point, and he could even see the camp three kilometres away.

Immediately following the translation phase prior to the landing on the water, the helicopter suddenly pivoted to the right. The pilot said the aircraft was a few feet above the water and moving about five or six miles per hour at the time.

He said he is convinced the passenger interfered, because he felt the right rudder pedal sink under his foot. The pilot and one witness said they noticed that the passenger did not seem to be feeling well during the few days preceding the accident, and they thought he may have felt ill during the landing on the water. The autopsy report attributes the passenger's death to drowning, and does not mention any evidence of convulsions or any other condition which may have caused such interference.

ANALYSIS:

The cause of the loss of directional control and sudden pivoting movement of the helicopter during the landing on the water was not determined. Passenger interference with the rudder pedals is a probable cause, but there is no medical evidence to support this hypothesis.

It is possible that the right float accidentally touched the surface of the lake during the translation preceding the landing on the water. The violence of the yaw produced by such contact would have been directly proportional to the translation speed of the helicopter. However, water contact by one float at the translation speed reported by the pilot (five or six miles per hour) could not have produced a yaw as strong as that observed.

CONCLUSIONS:

Findings:

1. The helicopter overturned after the main rotor touched the surface of the water following a sudden right yaw.

2. The passenger's side of the helicopter was equipped with rudder pedals, which were accessible to the passenger.

3. The pilot was qualified for the flight, but his licence expired eight months before the accident.

Causes:

For undetermined reasons, the helicopter overturned in the water after the main rotor touched the surface of the water following a sudden right yaw during the water landing.

HUGHES 500-369HS (Helicopter) N369BH
LETHBRIDGE, ALBERTA
16 NOVEMBER 1989

REPORT NUMBER: 89-W0272 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1701 MST
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	7,500	1,500
LAST 90 DAYS	25	5

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The pilot and passenger departed from Penticton, British Columbia and, after a brief stop en route to add 10 gallons of fuel from jerry cans, proceeded to Lethbridge, Alberta. The helicopter was transitioning to land, at an altitude of less than 100 feet, when the engine suddenly lost power. The helicopter landed heavily on runway 30 and rolled onto its side when the right skid gear collapsed.

The aircraft fuel system was drained and found to contain about one litre of fuel. Fuel was added and the engine was test-run with the drive train disconnected. No mechanical discrepancy was found that affected engine power output.

The aircraft fuel gauge read about 175 pounds, and the fuel low quantity warning light did not illuminate prior to the loss of engine power. The fuel quantity transmitter was removed and tested for operation. Fuel quantity was indicated correctly, and the low quantity light illuminated at about 50 pounds.

The pilot normally confirmed fuel remaining by checking consumption against flight time. During this flight, he did not monitor elapsed time and, thus, was unable to confirm the accuracy of the fuel quantity indication.

Inspection of the fuel tank bay revealed that the fuel bladder was partially collapsed and did not conform to the walls of the tank bay. The fuel tank vent system was examined, and it was discovered that the fuel tank vent fairing was missing from the fuselage. This device is designed to provide a positive pressure within the fuel tank during forward flight.

The engine lost all power due to fuel exhaustion. The missing fuel tank vent fairing induced a negative pressure and caused the fuel bladder to partially collapse and impinge on the float arm of the fuel quantity transmitter. Interference of the float arm resulted in an erroneous high fuel quantity reading and disabled the proper functioning of the low quantity warning circuit.

CONCLUSIONS:

Findings:
1. The engine lost all power due to fuel exhaustion.

2. The fuel tank vent fairing was missing from the fuselage, causing a negative pressure and the partial collapse of the fuel bladder.

3. The collapsed fuel bladder interfered with the operation of the fuel quantity transmitter, causing an erroneous high fuel quantity indication and preventing the operation of the fuel low quantity warning light.

4. The pilot did not monitor fuel consumption relative to flight time.

Causes:
A missing fuel tank vent fairing led to erroneous readings.

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ALBERTA GOVERNMENT SERVICES
BELL 206B JETRANGER III (Helicopter) C-GFSE
SUNDRE, ALBERTA
23 FEBRUARY 1989

BRIEF NUMBER: 89-W0046 (Incident)
LOCAL TIME: 1000 MST
OPERATION: State
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	14,000	5,000
LAST 90 DAYS	150	150

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was positioning the helicopter for refuelling in the forestry compound when he backed into a chain-link fence. The tail rotor struck the fence, and the pilot

immediately moved the aircraft forward away from the fence. The main rotor then struck the top of a fuel shed in front of the aircraft. The pilot landed the aircraft without further incident.

RITCHIE BD-4 (Amateur-built) C-GMED
ACME AIRPORT, ALBERTA
04 FEBRUARY 1989

BRIEF NUMBER: 89-W0025 (Accident)
LOCAL TIME: 1700 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	650	220
LAST 90 DAYS	0	0

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot, who had not flown for five months, intended to complete several high speed taxi tests to see how the aircraft handled before attempting a local flight. He walked about one-quarter of the runway and noted intermittent patches of snow two to four inches deep on the surface. Considerable power was required to move the aircraft through the four-inch-deep layer of snow which covered the taxiway. The wind was 310 degrees magnetic at 15 knots, and the first trial was attempted on runway 31. The aircraft began to veer right after moving about 800 feet. At this point, the airspeed indicator was fluctuating between 40 and 60 mph indicated airspeed. The pilot applied hard left brake, but the aircraft, which is steered by differential braking, departed the runway, and the nose gear collapsed. The aircraft nosed down and came to an abrupt stop about 40 feet to the right side of the runway.

GUY EDGARD LÉVESQUE SA 102-5 CAVALIER (Homebuilt) C-GEVA
BELOEIL, QUÉBEC
23 MARCH 1989

BRIEF NUMBER: 89-Q0074 (Accident)
LOCAL TIME: 1635 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

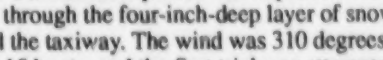
PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	400	50
LAST 90 DAYS	15	15

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was taking off on a local pleasure flight to practice touch-and-go landings. There was a slight crosswind from the right. The aircraft became airborne at about 45 miles per hour and was about 10 feet above the runway and still in ground effect when the aircraft banked to the left. The pilot tried to correct, but the left wing tip touched the ground. The aircraft lost speed and landed in the snow to the left of the runway. The nose wheel dropped into a ditch and the aircraft nosed over.

The pilot said the aircraft did not exhibit any mechanical defects prior to the accident.



SEA HAWKER (Amateur-built) C-GDSB
SAINT-HUBERT, QUÉBEC
08 APRIL 1989

BRIEF NUMBER: 89-Q0091 (Accident)
LOCAL TIME: 1150 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	102	2
LAST 90 DAYS	3	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

The pilot was returning from a local solo flight. During the flare, he placed the aircraft in a steep angle of attack at a speed of about 45 knots, and the aircraft struck the runway hard. The nosewheel was damaged and separated from the landing gear strut. The aircraft slid about 200 feet on its nose and came to rest off the runway on soft ground.

The aircraft was near its maximum allowable gross weight, and there was a cross-wind of about five knots.

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BASE BORDEN SOARING GROUP
SCHWEIZER SGS 2-33 C-GNPF
BORDEN, ONTARIO
23 APRIL 1989

REPORT NUMBER: 89-O/0176 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1312 EDT
OPERATION: Flying Club Recreational
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	23	21
LAST 90 DAYS	1	1

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

SUMMARY REPORT:

The pilot was on a recreational flight from Borden Airport. On base leg, the pilot encountered an area of descending air which persisted even after he had turned final. Once established on final, the pilot estimated that he would be unable to reach the runway and decided to attempt a landing in a clearing off the airport. On approach to the clearing, the glider struck several trees and yawed severely to the left striking the ground with its nose before coming to rest in an upright position.

The weather was reported as clear with winds out of the north at 15 knots. Mechanical turbulence had been reported in the circuit and on final approach to runway 36.

The pilot was familiar with the glider and had received a check flight within the last month. He reported that the occurrence flight had been uneventful and reported no control difficulties with the glider. After he turned base, he reported that he encountered a very strong area of descending air which continued even after he was established on final approach. When he realized that he was not able to safely avoid the trees short of the runway, he altered course to the east to attempt a landing in a clearing. On approach to the clearing, he attempted to fly over some trees, but was unsuccessful, and struck at least two trees with the left wing at a height of approximately six feet and one with the right wing at a height of approximately 10 feet. The glider began a yaw to the left, and the nose struck the ground. The main wheel struck the ground next, digging a rut, which brought the glider to a stop approximately 75 feet from where it first struck the trees.

Examination of the glider revealed that the spoilers had been partially deployed at the time the left wing struck the trees.

While on left base for runway 36, the pilot encountered an area of strong downdraft. Unable to reach the runway safely, the pilot selected an area in which to attempt an off-airport landing. The glider continued to descend, and, in an attempt to stretch his glide or to avoid striking some trees, the pilot raised the nose of the glider, causing a loss of airspeed.

CONCLUSIONS:

Findings:
1. The aircraft entered an area of strong downdraft.

2. The pilot had insufficient height to reach his intended landing site safely.

3. The spoilers were found partially deployed after the impact.

Causes:
The pilot flew into a strong downdraft.

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572110 ONTARIO LTD. (CAMERON BALLOONS ONTARIO)
CAMERON BALLOON LTD. 0-160 (Balloon)
C-GJHU
KINSALE, ONTARIO
22 MAY 1989

BRIEF NUMBER: 89-O/0224 (Accident)
LOCAL TIME: 0755 EDT
OPERATION: Specialty Recreational
DAMAGE: None
PILOT LICENCE: Free Balloon

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	683	79
LAST 90 DAYS	11	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	1	6

REPORTED CIRCUMSTANCES:

During the landing in a field, sudden changes in wind direction and down-flowing air caused the balloon to touch down harder than normal. The wind blew the balloon toward trees, and the pilot aborted the landing. The flight then continued for five additional minutes until the pilot found a more suitable landing area and landed. All passengers had been briefed on landing procedures; however, one passenger was not properly positioned during the first touchdown and sustained injuries.

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EDMONTON SOARING CLUB
SCHWEIZER SGS 2-33A (Glider) C-GWHT
CHIPMAN AIRPORT, ALBERTA
11 JUNE 1989

REPORT NUMBER: 89-W0113 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1130 MDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:

	INSTRUCTOR		STUDENT	
	ALL TYPES	ON TYPE	ALL TYPES	ON TYPE
TOTAL	1,000	50	44	4
LAST 90 DAYS	20	2	4	4

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	2
PASSENGERS	–	–	–

SUMMARY REPORT:

This was the student's second instructional flight of the day. Following a few air exercises, the student and instructor joined the traffic circuit on a left-hand downwind for runway 27. During the turn from downwind to final approach, a high sink rate developed. The left horizontal stabilizer struck a road sign, and the right wing struck a fence post as the aircraft descended onto the runway undershoot area.

The weather was good, and the wind was from the north at about 10 mph.

The downwind leg was flown closer to the runway than normal. As the student commenced a 180-degree turn from downwind to final, he judged that he was high and extended full spoilers. About halfway through the turn, the student realized that a high sink rate had developed so he partially closed the spoilers. It was apparent to both instructor and student, as they rolled out of the turn onto final approach, that they had a high sink rate and were too close to the ground. When the instructor took control of the glider, he noted that the spoilers were still partially extended, so he immediately closed them and attempted to arrest the descent. The approach was flown at an indicated airspeed of 50 to 55 mph.

The high sink rate that developed during the 180-degree turn onto final resulted in a critical loss of altitude. The situation deteriorated even further because the spoilers remained partially extended. The instructor was monitor-

ing the approach; however, he allowed the flight to progress past the point at which a safe recovery could be made.

CONCLUSIONS:

Findings:
1. The downwind leg was flown closer to the runway than normal.

2. The student misjudged his altitude and extended full spoilers which remained partially extended after a high sink rate had developed and substantial altitude was lost.

3. The instructor allowed the approach to proceed past the point where corrective action could have prevented the occurrence.

4. The horizontal stabilizer and wing were damaged when the glider struck a road sign and fence post on the perimeter of the airfield.

Causes:
The inappropriate use of spoilers during the turn onto final approach caused a high sink rate to develop and progress past the point where corrective action could have effected a safe recovery.

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CAMERON BALLOONS LTD.
0-160 (Balloon) C-GJHU
WHITBY, ONTARIO
11 JUNE 1989

BRIEF NUMBER: 89-O/0258 (Accident)
LOCAL TIME: 0740 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Balloon

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	333	14
LAST 90 DAYS	12	7

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	1	5

REPORTED CIRCUMSTANCES:

During approach to land, the descent rate of the balloon increased for no apparent reason. The pilot turned on the double burner; however, the balloon undershot the intended field, and the basket struck a hydro line support cable. The basket slid along the cable and hit a hydro pole. The balloon then regained altitude, and a landing was made in the field as originally planned. A wind of about 10 knots dragged the basket, and two of the passengers did not hang on tightly until the craft came to rest as previously instructed. Three passengers were injured, one sustaining a broken rib. The wind speed had increased sooner in the day than expected.

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RIDEAU GLIDING CLUB
SCHWEIZER SGS 1-26E (Glider) C-GNEU
GANANOQUE, ONTARIO
11 JUNE 1989

REPORT NUMBER: 89-O/0257 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1428 EDT
OPERATION: Specialty Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	35	5
LAST 90 DAYS	5	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	–

SUMMARY REPORT:

While on final approach to runway 30, after a 20-minute local flight, the pilot noticed that his airspeed had dropped from approximately 70 mph to less than 40 mph. The pilot pushed the control stick forward and ensured that the spoilers were retracted. As the aircraft neared the ground, the pilot pulled back on the control column. The nose of the aircraft was starting to rise to a nearly level attitude when the aircraft hit the ground approximately 570 feet short of the runway. The aircraft bounced and travelled a further 70 feet forward, coming to rest upright. The cockpit area maintained its integrity, although the pilot suffered severe back and chest injuries as a result of the impact.

The wind at the time of the occurrence was reported to be straight down the runway between 10 and 15 knots. There was a line of trees perpendicular to the final approach path that created an area of mechanical turbulence through which the aircraft flew. This turbulence was likely augmented by the strong thermal activity and produced a wind shear gradient. Several other pilots reported flying through a gradient in that area and losing between 5 and 10 mph while on approach.

While on final approach, the pilot allowed his airspeed to drop to, or near, the stall speed of the aircraft. The situation may have been aggravated by turbulence and wind shear in the area. The turbulence may also have masked the normal buffet experienced by the pilot as the aircraft approaches the stall. When the aircraft stalled, there was insufficient altitude for an effective recovery.

CONCLUSIONS:

Findings:
1. The aircraft stalled on final approach.

Causes:
The pilot did not maintain adequate airspeed during the approach in gusty wind conditions.

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SEA HAWKER (Amateur-built) C-GFSV
FORT ST. JOHN, BRITISH COLUMBIA 25 mi W
16 JUNE 1989

REPORT NUMBER: 89-P0146 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1445 PDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,390	18
LAST 90 DAYS	7	7

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	–	–	–

HISTORY OF THE FLIGHT:

At 1430 Pacific daylight time (PDT), the pilot took off from Charlie Lake, British Columbia in his amateur-built amphibious aircraft. At 1433 PDT, the pilot reported to the Fort St. John Tower that he he had taken off from Charlie Lake and that he intended to fly around there for a while. Nine minutes later, the Fort St. John Tower Controller requested the position of the aircraft, and the pilot responded that he was five miles west of Charlie Lake at 3,500 feet. There were no other radio transmissions received from the pilot.

At 1830 PDT, a riverboat operator sighted the fuselage of the wrecked aircraft as it floated down the Peace River. He tied a rope to the nose gear and towed the wreckage to shallow water. The pilot was not found and is presumed to have been fatally injured.

PERTINENT INFORMATION:

The aircraft was an amphibious biplane with the engine and pusher propeller mounted above the top wing and behind the aircraft cabin. The cantilevered wings were used as fuel tanks. Ten gallons of fuel had been removed from the aircraft fuel tanks prior to the flight. The weight and centre of gravity were within the approved limits; the centre of gravity was determined to have been near the aft limit.

The weather for 1400 PDT was 3,500 feet scattered, 25,000 feet thin broken, 50 miles visibility, and light winds. At this time, 2/10 of the sky was covered by towering cumulus clouds. One hour later, the observation was the same. Environment Canada subsequently reported that gradient winds over the area were light; however, the development of convective showers and thunder-showers could have produced locally variable and gusty winds at the time of the occurrence. Also, afternoon thunder-showers may have caused downdrafts, resulting in low-level wind shear.

The aircraft was broken into seven major pieces. The empennage and tail boom were torn from the aircraft but remained attached to the fuselage by the flight controls. Examination to the engine supports indicated that the engine had been crushed downward but remained attached to the fuselage. The upper left wing remained attached to the engine nacelle. The bottom left wing and both right wings had been torn from the aircraft and were found at various places along the river banks. The forward fuselage and passenger area had been crushed up and rearward. The Plexiglas canopy and canopy latch were broken but remained attached to the fuselage.

Both the left and right sponsons had sustained damage to the bottom forward area. The left sponson was crushed upward about one inch, and the right sponson was crushed upward about three inches. The right sponson had been torn from the wing. Damage to the bottom right side of the cockpit structure was more extensive than the damage to the left side.

The lower right wing was torn from the fuselage 31 inches from the wing root. The leading edge sustained significant impact damage, and the entire length of the leading edge had been split open. The "broomstick" appearance of the 45-degree ply fibres on the top of the wing and the absence of such evidence on the bottom indicate that the top of the wing failed in tension while the bottom failed in compression. There was also torsional failure evidence on the top skin. The damage to

the lower right wing indicates that the wing separated in a clockwise, aft and downward direction.

Both the left and the right wheels had been torn from the wings. Both hydraulic jacks were fully retracted indicating that the wheels were retracted at the time of the occurrence.

The seat-belt and locking mechanism were intact, and the lap belt attachment points were secure. The shoulder straps were attached to the top of the seat back which had broken away from the fuselage side during the impact. The shoulder straps were thus unsupported.

The damage sustained by the aircraft during the impact indicates that the deceleration forces were beyond the normal range of human tolerance. Both the seat bottom and the seat back were broken by downward "G" forces. The seat-belt locking mechanism was unlocked; however, the broken shoulder strap attachment points compromised the restraint system's effectiveness.

The CASB Engineering Laboratory completed a break-up analysis of the aircraft. It was concluded that the right sponson and right wing made the first major impact with the water. The right wing dug in, and the aircraft cartwheeled. It was also concluded that the aircraft made contact with the water at a speed that appeared to be higher than the normal recommended landing or take-off speed. Since there were no indications of a pre-impact structural failure, it was concluded that the aircraft did not crash as a result of a loss of structural integrity.

A small section of the inboard lower left wing skin had delaminated and formed a wrinkle. The wrinkle had been stabilized by injecting blue foam into the wrinkle cavity. Small holes had been drilled through the fiberglas skin and carbon spar cap along the entire length of the lower left wing, in a spanwise direction, immediately above the spar. Epoxy had been injected through the holes in an attempt to bond the spar to the spar cap. The epoxy bonded to the spar but did not bond to the carbon spar cap. Examination of the sectioned spar cap and of photographs that were taken during the construction phase indicate that the approved construction methods had been followed. The CASB Engineering Laboratory determined that the areas of delamination were present prior to the occurrence but did not cause a loss of structural integrity.

Other pilots who had talked to the accident pilot and had observed him flying the aircraft reported that he would occasionally drop the left wing on landing.

Three days prior to the occurrence, the pilot reported that the aircraft's airspeed indicator underread by 20 mph. He also reported that the aircraft had sluggish acceleration on water and he had replaced the propeller in an attempt to correct the problem. A few days prior to the occurrence, the aircraft was unable to take off from Charlie Lake with a full fuel load; however, it was able to take off after a total of 10 gallons of fuel was offloaded. The pilot had talked to friends about doing touch-and-go landings from the Peace River to see if aircraft performance would be better. The Peace River is a swiftly flowing river surrounded by high steep banks. The river elevation is approximately 800 feet lower than Charlie Lake.

ANALYSIS:

The pilot had talked to friends about doing touch-and-go landings on the Peace River, Therefore, it is probable that the reason the wreckage was found in the river was because the pilot was checking the aircraft's take-off performance at the lower altitude.

The pilot reported that the aircraft's airspeed indicator underread by 20 mph. If a correction was not applied, the airspeed at which the pilot landed the aircraft would have been 20 mph faster than the recommended speed. A landing at this higher airspeed would have compounded any control problems encountered during the landing attempt. Since the damage was more severe on the right side of the aircraft, it is probable that the left wing dropped and the left sponson touched the water first and bounced, causing the aircraft to roll rapidly to the right. The right sponson then dug in and was torn off, allowing the right wing to enter the water and initiate a cartwheel. Because the airspeed at which the landing was attempted was higher than normal, the pilot was unable to react fast enough to maintain control of the aircraft. It could not be determined if weather conditions aggravated the loss of control situation.

CONCLUSIONS:

Findings:

1. The pilot was attempting a landing on the river.

2. The aircraft's airspeed indicator underread by 20 mph.

3. The pilot was unable to react fast enough to maintain control of the aircraft when it bounced on landing.

Causes:

The pilot was unable to maintain control of the aircraft when it bounced during a landing attempt at a faster than normal airspeed.

ZENAIR STOL CH-701 C-GGBA
DUNCAN, BRITISH COLUMBIA
24 JUNE 1989

BRIEF NUMBER: 89-P0152 (Accident)
LOCAL TIME: 1740 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	538	0
LAST 90 DAYS	7	0

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	1

REPORTED CIRCUMSTANCES:

The pilot, who was not familiar with this aircraft type, intended to make a few landings at a private grass strip. He made a low approach to the strip in order to touch down at the beginning of the runway in anticipation of a touch-and-go landing. On short final, the pilot applied power, but the engine did not respond immediately. When the engine did respond, the aircraft's nose pitched up. The pilot counteracted by pushing forward on the control column, causing the nosewheel to contact brush and rough ground short of the runway. The aircraft then swung to the left and was substantially damaged when it struck heavier brush. The pilot and passenger were not injured.

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RICKETTS KB2 (Gyroplane) C-GAVP
COBDEN AIRPORT, ONTARIO
02 JULY 1989

BRIEF NUMBER: 89-O/0299 (Accident)
LOCAL TIME: 1500 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	37	10
LAST 90 DAYS	N/A	1

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

Shortly after the gyroplane took off, the airspeed decreased by 10 mph, so the pilot levelled off to correct the situation. The airspeed continued to decay, and the pilot turned to return to the runway. The gyroplane lost too much altitude during the turn, and the pilot flared to land approximately 160 feet from the runway. The main rotor blades caught in long grass, and the torque twisted the mast off.

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GLASFLUGEL STANDARD LIBELLE (Glider)
C-GJFQ
RUTHERFORD, ONTARIO 4 mi S
02 JULY 1989

REPORT NUMBER: 89-O/0297 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1700 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Glider

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,400	3
LAST 90 DAYS	20	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	1	-
PASSENGERS	-	-	-

SUMMARY REPORT:

On the take-off roll during a winch launch, the left wing of the glider dropped to the ground and began to drag in the five-inch-high grass. The left wing tip continued to drag in the grass for approximately 183 feet, pulling the aircraft to the left side of the runway. As the aircraft reached the side of the runway, it became airborne and gained approximately 20 feet of altitude. The aircraft then turned steeply to the left, struck the ground in an almost vertical attitude, and bounced approximately 41 feet before coming to rest. The pilot was seriously injured.

Visual meteorological weather conditions prevailed the afternoon of the accident.

This flight was the pilot's fourth in this type of glider. A full control check was made before the take-off roll began, and all controls functioned properly, as they had for the previous flight only moments earlier. The aircraft was equipped with a five-point restraining system which the pilot was wearing.

Inspection of the wreckage revealed no evidence of any pre-impact discrepancies with the aircraft.

During the take-off roll, the left wing of the glider dropped to the ground because there was insufficient speed for the pilot to hold the wings level with aileron control. The length of the grass probably slowed the acceleration of the aircraft and added a substantial amount of drag to the left wing tip. This additional drag yawed the aircraft to the left as the aircraft was pulled down the runway by the winch. As the right wing accelerated faster than the left wing, it began to lift, placing more drag on the left wing tip. When the aircraft became airborne, the left wing acted as a pivot point about which the aircraft began to rotate until the left wing finally became airborne. The aircraft continued to yaw to the left and never gained sufficient altitude for the pilot to recover.

CONCLUSIONS:

Findings:

1. The aircraft controls functioned normally.

2. The left wing tip dropped to the ground and dragged in the grass.

3. The increased drag on the left wing tip pulled the aircraft to the left side of the runway.

4. The right wing and fuselage became airborne while the left wing was still dragging on the ground.

5. The five-point restaining system reduced the degree of injury to the pilot.

6. The grass on the runway was approximately five inches high.

Causes:

The pilot did not abort the take-off when he was unable to lift the left wing.

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MITCHELL DL PIETENPOL (Amateur-built)
C-FDJM
MORINVILLE, ALBERTA 2 mi N
03 JULY 1989

BRIEF NUMBER: 89-W0139 (Accident)
LOCAL TIME: 1315 MDT
OPERATION: Private
DAMAGE: Substantial
PILOT LICENCE: Private Training

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	87	0.5
LAST 90 DAYS	6	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The pilot was practising landings and take-offs and was on final approach when he stalled the aircraft. The aircraft landed heavily just short of the grass strip; the propeller, landing gear, and engine cowlings were damaged.

The pilot felt his speed had been too slow on final and that he should have applied more power.

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FIREFLY 7 (Balloon) C-GWLL
OKOTOKS, ALBERTA
09 JULY 1989

BRIEF NUMBER: 89-W0201 (Accident)
LOCAL TIME: 2100 MDT
OPERATION: Private Recreational
DAMAGE: Minor
PILOT LICENCE: Balloon

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	44	44
LAST 90 DAYS	28	28

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	1	1

REPORTED CIRCUMSTANCES:

The pilot had touched down to reduce his groundspeed, the balloon bounced slightly, and then the pilot opened the vent to land. On the second touchdown the basket dragged about 30 feet before stopping. The occupants

climbed out of the balloon. One of the passenger's indicated that she had injured her knee. Later, it was confirmed that she had broken her kneecap.

CAMERON BALLOONS LTD.
A-210 (Balloon) C-GXYS
STOUFFVILLE, ONTARIO
11 JULY 1989

BRIEF NUMBER: 89-O/0327 (Accident)
LOCAL TIME: 2020 EDT
OPERATION: Private Recreational
DAMAGE: None
PILOT LICENCE: Free Balloon

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	711	74
LAST 90 DAYS	30	19

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	1	6

REPORTED CIRCUMSTANCES:

The balloon descended at approximately 150 feet per minute with a ground speed of about five knots to land in a hay field. The balloon bounced, which is not unusual, and landed the second time with a descent rate of approximately 50 feet per minute. The basket remained upright. One passenger suffered a broken ankle during the second touchdown. The passengers had been briefed about landing procedures and the correct stance to assume for landing.

AIR CADET LEAGUE
SCHWEIZER SGS-2-33A (Glider) C-FQYI
SAINT-HONORÉ, QUÉBEC
19 JULY 1989

BRIEF NUMBER: 89-Q0204 (Accident)
LOCAL TIME: 0900 EDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	107	45
LAST 90 DAYS	16	16

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	2
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The student pilot and his instructor were conducting a flight in the glider, which was to be launched by a winch. The purpose of the flight was to return and land after a simulated cable failure. The glider took off into the wind, and procedures were reviewed during the initial climb. Everything seemed to be in order, and the cable was released about 260 feet above ground level (agl). The student pilot did not immediately make a right turn as planned, and the glider moved to the left, away from the runway. The instructor took the controls and made a right turn and headed back for a downwind landing. On final approach, she was unable to retract the spoilers soon enough, and the aircraft made a hard landing in a right banked attitude. The right wing touched the ground first and was damaged.

GLASER DIRKS DG 202/17 (Glider) C-GVRR
CHIPMAN, ALBERTA
22 JULY 1989

REPORT NUMBER: 89-W0166 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1430 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Glider

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	260	40
LAST 90 DAYS	18	13

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

SUMMARY REPORT:

During the take-off roll from runway 27, the glider moved to the left of the tow plane. As the glider pilot attempted to move back into tow position, the right wing tip of the glider touched the ground. The glider continued turning to the right and lifted off the ground momentarily. The glider pilot released the tow cable, and the glider swung 180 degrees to the direction of intended flight. The canopy popped off, and the tail section broke off the aircraft.

The weather at the time of the occurrence was clear with the wind from 270 degrees at eight knots. The temperature was 25 degrees Celsius.

The runway was a grass strip that was in good condition although wet from the recent rains.

There were no mechanical discrepancies reported with the aircraft.

During the take-off roll, the glider pilot allowed the glider to move to the left of the tow plane. In an attempt to regain the proper tow position, the pilot overcontrolled the glider, causing the right wing to touch the ground. The glider continued turning right, stopping 180 degrees to the direction of flight.

CONCLUSIONS:

Findings:
1. There were no mechanical discrepancies reported with the aircraft.

2. On the take-off roll, the glider pilot allowed the glider to move out of the tow position.

3. The pilot overcontrolled the glider while attempting to regain the proper tow position.

Causes:
When the glider moved out of the tow position the pilot overcontrolled the aircraft, causing the right wing tip to strike the ground.

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BALLOON DIMENSIONS
BALLOON WORKS FIREFLY 8B C-FAPI
CALGARY, ALBERTA
26 JULY 1989

REPORT NUMBER: 89-W0170 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0805 MDT
OPERATION: Specialty Aerial Advertising
DAMAGE: Minor
PILOT LICENCE: Free Balloon

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	600	600
LAST 90 DAYS	40	40

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	1	1

SUMMARY REPORT:

The pilot and two passengers launched from Richmond Green Park, within the Calgary city limits, for a flight to the northwest. On the approach to land, over the northwest city limits, the pilot descended into a small open area that was about 20 feet lower than an area where construction equipment was working. As the balloon approached the elevated construction area, the pilot observed an earthmover proceeding across the balloon's projected flight path. He commenced an immediate ascent to clear the rising terrain and the oncoming earthmover. The basket struck the earthmover, and the pilot immediately deflated the balloon and landed.

The pilot's reported intention was to descend close to the ground to check the surface winds, then ascend a few feet to clear the elevated construction zone and land in a grass-covered field, about 1,000 feet beyond the construction area. The pilot estimated the surface wind to be from the southeast at four knots.

The earthmover was following a counterclockwise race track pattern from the pick-up zone to the unloading zone. Moments prior to the collision, the driver had rounded the south end of the track and was proceeding

up an incline northbound toward the balloon, approaching from his right. The driver's seat is on the left side, and the view to the right was obstructed by the supporting members for the overhead canopy and the exhaust stack. The driver reportedly did not see the approaching balloon until the basket struck the air cleaner on top of the engine.

The pilot's licence validation certificate had expired on 10 June 1988.

When the earthmover unexpectedly turned up the incline toward the balloon, the pilot immediately opened the burner in an attempt to ascend. However, by the time the balloon responded, it was too late and the rate of climb was not sufficient to clear the earthmover. The pilot's decision to check the surface winds resulted in a descent to an altitude lower than that required to clear all obstacles to reach his landing site. His choice of landing site and descent profile for the approach should have considered the moving earthmovers in the construction zone and ensured that there was adequate clearance while passing over the area.

CONCLUSIONS:

Findings:

1. The pilot's descent profile over a construction zone did not provide sufficient altitude to clear all the obstacles.

2. The driver of the earthmover did not observe the oncoming balloon until after the collision.

3. The pilot's licence validation was expired at the time of the occurrence.

Causes:

While on final approach, the pilot descended to an altitude that did not ensure safe passage over a construction zone.

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COUSINS ZENITH CH200 (Amateur-built) C-GAKX
OSHAWA, ONTARIO
04 AUGUST 1989

REPORT NUMBER: 89-O/0377 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2100 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,100	360
LAST 90 DAYS	25	25

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

SUMMARY REPORT:

The pilot was practising touch-and-go landings at Oshawa, Ontario. As the aircraft lifted off after the first landing, the nosewheel oleo assembly separated from the aircraft. The pilot completed a circuit and was able to land the aircraft and shut the engine down before the nosewheel strut came into contact with the ground. The aircraft skidded on the nose strut for approximately 300 feet, then left the runway and came to a halt beside the runway, upright.

Visual meterological conditions prevailed at the time of the accident.

The pilot, who was properly licensed and qualified to fly the aircraft, was experienced on the type. The aircraft was frequently flown into and out of grass strips.

Four 1/4-inch AN bolts hold the nosewheel and oleo assembly to the nosewheel strut housing. These four bolts are concealed underneath the nosewheel pant and can be examined only if the wheel pant is removed. Inspection revealed that one bolt was completely missing. The hole that had been machined into the metal was considerably elongated in a vertical direction, and some of the threads had been stripped away. The other three retaining bolts remained in their mounting holes but were all missing the heads. The area where the heads had failed showed that the surface was either sheared or fatigued around the circumference of the bolt and the centres of the surfaces showed signs of overload failure. A second machined hole at the rear of the oleo housing also showed elongation but was at an angle of approximately 45 degrees.

The attach bolts were probably damaged as a result of the increased stress the bolts were subjected to during

operations into and out of rough grass strips. Two of the bolt heads failed over a relatively short period of time. A third bolt had been damaged, but the head remained in place long enough to distort the mounting hole before the head broke off completely. The last bolt was the only attach point left, which remained in place for an undetermined period of time until it finally dropped out and the nosewheel assembly fell off the aircraft.

CONCLUSIONS:

Findings:
1. The aircraft was operated frequently into and out of grass strips.

2. The nosewheel mounting bolts can be examined only when the nosewheel pant is removed.

3. Three of the heads were missing off the bolts and the fourth bolt was completely missing.

4. When the last bolt let go, the nosewheel fell off.

Causes:
Inadequate inspection of the nosewheel mounting bolts failed to detect worn bolts.

PIENTENPOL AIR CAMPER GN1
(Amateur-built) C-FHXW
ESTERHAZY, SASKATCHEWAN 12 mi E
06 AUGUST 1989

BRIEF NUMBER: 89-C0156 (Accident)
LOCAL TIME: 2030 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	250	50
LAST 90 DAYS	3	5

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

Shortly after take-off from his farm strip, the pilot initiated a turn. There was forest fire smoke in the air, and the horizon was not distinct. The aircraft descended in the turn, without the pilot's realising it, and a main wheel caught on a power line. The line broke, but resultant drag on the aircraft caused it to stall and land heavily. The pilot sustained a back injury.

YORK SOARING LTD.
SCHWEIZER SGS-1-26D C-FSDI
ARTHUR EAST, ONTARIO
31 AUGUST 1989

BRIEF NUMBER: 89-O/0430 (Accident)
LOCAL TIME: 1520 EDT
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	N/A	N/A
LAST 90 DAYS	N/A	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	–

REPORTED CIRCUMSTANCES:

While on final approach, the glider encountered turbulence. At about 300 feet above ground level, the student pilot, who was flying solo, detected a high sink rate and decided that he was on a collision course with hydro wires should he maintain his approach for the runway. The pilot executed a 180-degree turn and landed hard in a field alongside a roadway.

JODEL D-11 (Amateur-built) CF-XRZ
BROCKVILLE, ONTARIO
02 SEPTEMBER 1989

BRIEF NUMBER: 89-O/0434 (Accident)
LOCAL TIME: 1245 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	191	81
LAST 90 DAYS	9	N/A

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

REPORTED CIRCUMSTANCES:

During the take-off run from runway 04, the aircraft veered left. The pilot applied right rudder and right brake; however, he could not control the aircraft, so he pulled off the power. The aircraft stopped on the left side of the runway in a nose-down attitude.

The wind was from 340 to 020 degrees magnetic and was gusty.

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MARANDA AMF-14 (Amateur-built) C-FRTC ST. QUENTIN, NEW BRUNSWICK 21 mi E 10 SEPTEMBER 1989

REPORT NUMBER: 89-A0240 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1200 ADT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	1,075	65
LAST 90 DAYS	27	27

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	–	1
PASSENGERS	–	–	1

SUMMARY REPORT:

The aircraft departed from Balmoral, New Brunswick on a flight to Grand Falls, New Brunswick. Thirty minutes after take-off, the engine (Lycoming Model O-290-D2B) suddenly lost power. The pilot applied carburettor heat, worked the throttle back and forth, and achieved one increase in rpm before the engine stopped. The aircraft was flying over a forested area, and the pilot chose a narrow logging road with wood piles on either side for a forced landing. After touchdown, the left wing struck a wood pile, tearing off a portion of the outer wing and the aileron. The aircraft continued for a short distance, then went up on its nose and spun to the right, tearing the engine off the firewall. The aircraft came to rest upright, off the left side of the logging road. The pilot and the passenger were unhurt.

There was no indication of any pre-accident discrepancy with either the flight or engine controls. The engine and propeller assembly were lying on the right side of the aircraft. The propeller was only slightly damaged, with one blade bent back slightly, indicating that no power was being developed on impact. There was ample fuel on board, and a sample of fuel was taken from the gascolator outlet and sent to the CASB Engineering Laboratory for analysis.

The fuel being used was regular, unleaded automotive gasoline. This fuel is not approved by the engine manufacturer. Examination of the fuel system and engine assembly did not reveal any cause for the engine stopping. Carburettor icing was not suspected because the pilot described the power loss as very sudden, not the gradual decrease in power normally associated with carburettor ice. The carburettor was examined and found to be clean and in good condition. An engine teardown was completed, and no discrepancies were found. The cause of the engine power loss could not be determined.

CONCLUSIONS:

Findings:
1. The engine failed while the aircraft was in cruise flight.

2. There was ample fuel in the tanks.

3. The fuel used was regular, unleaded automotive gasoline, which is not approved by the engine manufacturer for use in this model engine.

Causes:
The cause of the engine power loss could not be determined.

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JASCO 150 (Amateur-built) CF-DBN DAWSON CREEK, BRITISH COLUMBIA 24 SEPTEMBER 1989

REPORT NUMBER: 89-W0235 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1425 PDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	420	0.6
LAST 90 DAYS	2	0.4

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	1	–	–
PASSENGERS	–	1	–

HISTORY OF THE FLIGHT:

The pilot had planned a short recreational flight in his recently purchased, single-seat, amateur-built aircraft. Accompanying him as a passenger was his 15-year-old son, seated on the battery case in the luggage compartment behind the pilot's seat.

The aircraft took off from the grass strip paralleling runway 06 at the Dawson Creek airport. The tail wheel did not come off the ground during the take-off roll, and, when the aircraft lifted off, it assumed a nose-high attitude and climbed steeply to an altitude of approximately 100 feet. The aircraft then rolled left, and the nose dropped into a steep diving turn. The aircraft rotated through 250 degrees before striking the runway.

PERTINENT INFORMATION:

The pilot had been flying light single-engined aircraft for 20 years and had made two earlier flights in the Jasco 150. However, he had not previously carried a passenger in this aircraft but was aware that others had done so.

A thorough check of the wreckage failed to reveal any mechanical reason for the loss of control. Severe gouging, bending, and twisting of the propeller indicated a high power setting at impact, and all failures to the controls were due to impact forces. Weather conditions were satisfactory for the flight. There was no significant cloud, the visibility was more than 15 miles, and the wind was light.

The aircraft had never been weighed, nor had a centre of gravity been determined since it was constructed in 1967. The aircraft had been flown solo successfully for over 20 years, always with the elevator trim near the central position. On the several occasions when a passenger had been carried, the passenger had knelt on the floor of the luggage compartment holding himself against the back of the pilot's seat. On the accident flight, the passenger sat on the battery box located at the rear of the luggage compartment, 48 inches to the rear of the centre of the pilot's seat. In this configuration, a 125-pound passenger would move the centre of gravity five inches to the rear, and 3.1 inches outside of the permissible centre of gravity range.

ANALYSIS:

Neither weather conditions nor any mechanical discrepancy contributed to the occurrence. The weight and location of the passenger in this single-seat aircraft moved the centre of gravity outside the permissible centre of gravity range, making the aircraft tail-heavy to the extent that it was uncontrollable.

CONCLUSIONS:

Findings:

1. A passenger was being carried in this single-seat aircraft.

2. No seat or seat-belt was provided for the passenger.

3. The centre of gravity was 3.1 inches aft of the rear centre of gravity limit.

4. The aircraft was uncontrollably tail heavy on take-off.

Causes:

The pilot attempted to take off in an aircraft that was uncontrollably tail heavy because a passenger was seated in the baggage compartment.

SHOEMAKER GY20 MINICAB (Amateur-built)
CF-UCY
TOTTENHAM, ONTARIO 2 mi N
29 OCTOBER 1989

REPORT NUMBER: 89-O/0516 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1120 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	120	1
LAST 90 DAYS	1	1

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	–	1	–
PASSENGERS	–	–	–

SUMMARY REPORT:

The aircraft was on a local flight from a private field north of Tottenham, Ontario. As the aircraft made a low pass over the field, the left main landing gear touched down. The right wheel touched down next, and then the right wing tip began to drag along the ground. It dragged for approximately 30 feet, then dug into the soft ground. The nose of the aircraft then struck the ground, followed by the left wing tip. The pilot, who was not wearing his lap belt, was ejected from the aircraft before it flipped over onto its back.

The weather was reported as being clear with the winds from the southwest at approximately five knots.

The pilot completed his pilot training in 1961 and had accumulated an estimated 120 hours of flying time. He had previously owned and operated another aircraft from his farm strip but had sold it in 1979 and had not flown as pilot-in-command since that time. The pilot's licence validation certificate had expired.

No pre-impact unservicabilites of the engine or any of the aircraft's systems could be found, and none was reported. The pilot reported that the aircraft controls were very sensitive and that the aircraft was very light. He reported that he had intended to do a low pass over the field, but, as he approached, the left main landing gear touched down. He stated that the bump startled him, and he quickly applied right aileron. The aircraft immediately rolled to the right, and the right main gear touched down, followed by the right wing tip which dug into the ground.

The pilot was unfamiliar with the performance and handling of the aircraft; this combined with the lack of flying experience for the past nine years was sufficient that the pilot was not able to adjust quickly enough to the changes taking place during the low pass. The aircraft drifted lower than the pilot had planned, and, when the left main landing gear unexpectedly touched the ground, the pilot overreacted with excessive right aileron. The aircraft quickly rolled to the right, and the right main landing gear and wing tip struck the ground before the pilot could correct.

CONCLUSIONS:

Findings:

1. The pilot had not flown an aircraft solo for nine years, and this was his first solo flight on this model of aircraft.

2. The aircraft left main landing gear unexpectedly touched down during the low pass.

3. The pilot overcontrolled the aircraft after the gear touched the ground.

4. The right wing tip dragged on the ground and dug in, and the aircraft cartwheeled and flipped over onto its back.

5. The pilot was not wearing his lap belt, and he was ejected from the aircraft.

6. The pilot's licence validation certificate had expired.

Causes:

The pilot had not flown solo for nine years, was unfamiliar with the aircraft, and lost control.

RAVEN AEROSTAR (Balloon) N2791C
NEPEAN, ONTARIO
02 FEBRUARY 1990

BRIEF NUMBER: 90-O/0058 (Accident)
LOCAL TIME: 1615 EST
OPERATION: Private Recreational
DAMAGE: None
PILOT LICENCE: Commercial Balloon

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	246	246
LAST 90 DAYS	2	2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	1	-
PASSENGERS	-	-	2

REPORTED CIRCUMSTANCES:

The flight began in light winds at Centrepoint in Nepean, Ontario. The wind increased from 4-6 knots to approximately 10 knots during the flight. The pilot and passengers prepared for a high wind landing on a frozen snow-covered ploughed field. The balloon descended steeply onto the field with the basket tipping over upon contact. The basket dragged along the ground for approximately 20 to 60 feet until it came to rest, which is normal for a high wind landing. During the tip-over, the pilot's arm was pinned between the basket and the ground. The pilot received lacerations to her scalp when her head struck the ground.

HASELOH RAF-2000 (Autogyro) C-FFTJ
PONOKA, ALBERTA
10 FEBRUARY 1990

BRIEF NUMBER: 90-W0042 (Accident)
LOCAL TIME: 1000 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Student Pilot

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	305	55
LAST 90 DAYS	45	45

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

While climbing out at a 40 to 45 degree angle, at 30 miles per hour, the pilot heard a loud bang, and then the engine stopped. A forced landing was carried out. The aircraft landed hard, breaking an axel, and then rolled onto its side, substantially damaging the rotor blades. A post landing inspection was carried out and it was learned that two blades of the three-bladed propeller had separated from the hub. Both of the separated blades had struck the rotor blades. A Transport Canada "Service Difficulty Report" form submitted by the pilot stated that the manufacturer rated the propeller at 100 horsepower, while the engine in use was rated at 110 horsepower.

JODEL F-11-E (Amateur-built) C-GFST
VILLENEUVE AIRPORT, ALBERTA
23 MARCH 1990

BRIEF NUMBER: 90-W0070 (Accident)
LOCAL TIME: 1114 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	100	20
LAST 90 DAYS	20	0.2

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The pilot was landing on runway 26 after completing a circuit. Just after touchdown, before the tail wheel came down, the wind caused the aircraft to veer to the left side of the runway. The aircraft skidded partially sideways down the runway damaging the main gear and propeller. The wind at the time of the occurrence was reported to be 300 degrees magnetic at 15 knots.

SA 750 ACRODUSTER 2 (Amateur-built) C-GVUC
COURTENAY, BRITISH COLUMBIA
27 MARCH 1990

BRIEF NUMBER: 90-P0101 (Accident)
LOCAL TIME: 1730 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

PILOT HOURS:	ALL TYPES	ON TYPE
TOTAL	800	10
LAST 90 DAYS	1	0

INJURIES:	FATAL	SERIOUS	MINOR/NONE
CREW	-	-	1
PASSENGERS	-	-	-

REPORTED CIRCUMSTANCES:

The aircraft was in a descending left turn to land on the runway when it stalled. The aircraft was too low for the pilot to recover control. The aircraft crashed, wings level, into the river. The pilot was uninjured; he was wearing a five-point seat harness restraint system.

Annex 1

List of Reports by Aircraft Manufacturer and Type

REPORT BY AIRCRAFT MANUFACTURER AND TYPE

MANUFACTURER	TYPE	REPORT NUMBER	PAGE
		P00101	138
AERONCA	11AC	P90159	66
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AEROSPATLE	ASTAR	Q90050	108
AEROSTAR	601	O90149	55
BALLOON WOR	FIRE8B	W90170	132
BEDE	BD4	W90025	123
BEECH	18	O90059	12
	19	O90313	69
	35	O90217	57
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	55	O90045	47
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	90	A90214	106
	95	C90047	12
BELL	204B	Q90202	113
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BROCK	KB-2	O90299	129
CAMERON	A-210	O90327	131
CAMERON BALLOONS		O90224	125
		O90258	126
CANADAIR	CL215	C90147	106
CAVALIER	SA-102	Q90074	123
CESSNA	120	Q90192	68
	140	C90231	81
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		C90191	20
		O00027	83
		O00103	23
		O90191	56
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		Q90333	21

MANUFACTURER	TYPE	REPORT NUMBER	PAGE
CESSNA (cont'd)	152	C90163	18
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		Q00058	22
		W00039	21
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		P90094	29
		P90137	61
		P90307	81
		W90150	17
		W90163	71
	177	W90033	50
	180	A90270	102
		C00040	11
		C90042	50
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		W90261	81
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		O90342	70
		W90191	73
	185	A90149	34
		C90015	1
		C90017	87
		C90022	1
		C90029	2
		C90031	27
		C90055	28
		C90097	5
		C90117	16
		O90203	90
		O90230	91
		O90243	31
		P90176	35
		Q90151	6
		Q90197	94
		Q90224	7
		Q90242	99
		Q90256	100
		W00008	42
		W90089	29
		W90244	9
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		C90087	5
		C90185	9
		O90369	98

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CESSNA (cont'd)	206	P90131	92
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		Q00055	84
	310	Q90156	63
	337	O90408	74
		W90288	82
	421	P00099	11
		P90025	25
	T303	O90483	78
CHAMPION	7GCB	C00015	103
DEHAVND CAN	DHC2	C90222	10
		C90230	41
		P90087	90
		P90273	40
	DHC3	C00007	10
		P90135	62
		Q90047	3
		Q90223	8
	DHC6	C00049	42
		W00082	1
	DHC6-3	W90100	104
DOUGLAS	B26	W90104	15
ENSTROM	F28A	Q90125	120
ERCO	415	W90060	51
FIREFLY 7		W90201	130
FLEET ACFT	80	P90006	23
FLY BABY		C90121	66
FUNK B85C		W90014	46
GLASER-DIRK	DG-200	W90166	132
GLASFLUGEL	201	O90297	129
GRUMMAN	G164	W90143	35
GRUMMANAMER	AA5	O90489	79
HUGHES	500	O90238	110
		O90455	116
		P00076	118
		P90040	107
		W90272	122
JASCO	150	W90235	135
JODEL	D11	O90434	134
	F11	W00070	138
LAKE	LA4	A90180	94
		P90189	98
LUSCOMBE	8	P00152	104
MARANDA	AMFS14	A90240	135
MOONEY	M20B/C	C90067	55
	M20J	C90204	80
NOORDUYN	UC64	C90200	40
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PIETENPOL		C90156	134
		W90139	130
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		Q90018	46
		Q90130	91
	J4	O90368	99
	PA12	P00064	85
		Q90264	101
	PA16	A90009	87
	PA18	A90272	103
		O90308	93
		O90433	100
		P90230	74
		W90156	70
		W90255	20
		W90258	80
	PA22CP	O90119	50
		Q00008	82
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	PA22TC	A90119	59
	PA23AZ	P90004	44
		Q00012	41
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		Q90250	38
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	PA28	A90024	47
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		C00036	86
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		O90467	77
		Q00040	84
		Q90238	19
		W90157	18
	PA30	W00046	22
	PA31	C90110	7
		C90182	9
		P90020	47
		Q90093	29
		Q90180	68
		W00058	85
		W90032	26
	PA32	C90102	33
	PA44	O90153	14
POLISH ACFT	PZL104	O90220	58
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	SGS233	O90176	124
		Q90204	131
		W90113	125
SEAHAWK	AMPHIB	P90146	127
		Q90091	123
SIKORSKY	S58	C90143	114
STINSON	108	C90146	97
		P90074	54
		P90175	94
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TAYLORCRAFT	B/B12	C90093	60
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VOLMER	VJ22	W90101	91
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	89-03-21	W90062	53
	89-04-19	W90076	4
	89-05-06	W90089	29
	89-05-31	W90104	15
	89-06-09	W90112	111
	89-06-11	W90113	125
	89-06-19	W90122	64
	89-06-24	W90132	33
	89-07-03	W90139	130
	89-07-09	W90143	35
	89-07-09	W90201	130
	89-07-14	W90150	17
	89-07-19	W90157	18
	89-07-22	W90166	132
	89-07-23	W90163	71
	89-07-26	W90170	132
	89-07-29	W90176	37
	89-08-12	W90191	73
	89-09-03	W90217	39
	89-09-07	W90222	115
	89-10-25	W90255	20
	89-10-30	W90261	81
	89-11-16	W90272	122
	89-12-18	W90288	82
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	89-02-13	P90040	107
	89-03-25	P90074	54
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	89-04-10	P90084	55
	89-04-13	P90087	90
	89-04-16	P90089	109
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	89-07-22	P90184	71
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	89-09-24	W90235	135
	89-10-06	P90273	40
	89-11-09	P90297	117
	89-11-19	P90307	81
	90-01-07	P00011	103
	90-02-08	P00043	117
	90-02-25	P00064	85
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Manitoba	89-01-03	C90005	43
	89-01-19	C90015	1
	89-01-21	C90017	87
	89-02-27	C90042	50
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	89-03-31	C90058	13
	89-04-15	C90067	55
	89-04-17	C90070	56
	89-05-02	C90074	14
	89-05-15	C90087	5
	89-06-16	C90102	33
	89-06-17	C90110	7
	89-07-23	C90146	97
	89-07-25	C90147	106
	89-08-11	C90163	18
	89-09-02	C90185	9
	90-03-10	C00036	86
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New Brunswick	89-06-23	A90145	65
	89-08-14	A90214	106
	89-09-10	A90240	135
Newfoundland & Labrador	89-01-06	A90009	87
	89-01-28	A90024	47
	89-04-08	A90080	13
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	89-03-11	O90119	50
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	89-05-22	O90224	125
	89-05-28	O90230	91
	89-05-30	O90238	110
	89-05-31	O90243	31
	89-06-02	O90248	61
	89-06-11	O90257	126
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	89-07-20	O90342	70
	89-07-29	O90369	98
	89-07-31	O90368	99
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	89-08-19	O90408	74
	89-08-31	O90429	74
	89-08-31	O90430	134
	89-09-02	O90434	134
	89-09-03	O90433	100
	89-09-15	O90455	116
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	90-02-28	O00103	23
	90-03-17	C00040	11
	90-03-26	O00133	86
Prince Edward Island	89-10-24	A90270	102
	90-01-27	A00022	11
Québec	89-01-18	Q90018	46
	89-02-21	Q90047	3
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	89-03-23	Q90074	123
	89-04-02	Q90084	28
	89-04-08	Q90091	123
	89-04-14	Q90093	29
	89-05-14	Q90113	30
	89-05-20	Q90130	91
	89-05-23	Q90125	120
	89-05-29	Q90134	30
	89-06-12	Q90151	6
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	89-07-07	Q90192	68
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	89-07-14	Q90202	113
	89-07-19	Q90204	131
	89-07-20	Q90206	37
	89-08-06	Q90223	8
	89-08-06	Q90224	7
	89-08-09	Q90232	72
	89-08-16	Q90238	19
	89-08-18	Q90242	99
	89-08-30	Q90250	38
	89-09-02	Q90256	100
	89-09-07	Q90257	76
	89-09-11	Q90264	101
	89-09-27	Q90275	116
	89-12-11	Q90333	21
	90-01-04	Q00008	82
	90-01-06	Q00012	41
	90-01-19	Q00032	21
	90-02-02	Q00040	84
	90-02-18	Q00055	84
	90-02-20	Q00058	22
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Saskatchewan	89-02-10	C90031	27
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	89-08-16	C90167	73
	89-08-30	C90182	9
	89-09-19	C90191	20
	89-10-11	C90200	40
	89-10-16	C90204	80
	89-11-28	C90222	10
	89-12-13	C90230	41
	89-12-13	C90231	81
Yukon	89-06-17	W90120	64
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The following reports have not been issued in this publication, but are available upon request.

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AERO COMMANDER	500	C90225
AERONCA	11BC	O00008
	15AC	Q90188
AÉROSPATIALE	AS350	A90223
		Q90153
BEECH	23	P90095
		Q90304
	35	W90285
	76	Q90032
	90	W90057
	95	P90325
		Q90201
		W90130
BEECHCRAFT	35	O90561
	99	C90024
		C90113
BELL	204B	C90099
	206B	C90144
		O00109
		P90015
		P90022
		W00072
		W90165
		A90019
	206L	A90125
		O90353
		Q90319
BRITTEN-NORMAN	BN2A	P90228
	BN2A6	W90083
CESSNA	150	C90046
	152	O90174
		P90192
		Q00025
		Q90094
		Q90266
		Q90329
		W90137
		W90177
		O90251
		O90269
		Q90143
		Q90217
		W90141
	170	P90233
	172	O90165
		O90175
		O90218
		O90234
		O90269

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CESSNA (cont'd)	172	O90351
		O90457
		P00004
		P00100
		P90136
		P90251
		W00040
		W90133
		W90144
		W90227
		W90243
	180	P90248
		Q90263
		W90103
	182	A00073
		Q90073
		W90021
	185	C90057
		C90068
		C90098
		C90149
		C90190
		C90196
		C90201
		O90300
		P90109
		P90142
		P90278
		W90051
		W90117
		W90256
	188	W90078
	205	W90210
	206	A90012
		C90051
		C90060
		C90071
		C90096
		C90188
		O90332
		P90035
		W90071
		W90121
	207	W90152
		W90264
	210	O90454
	305	Q90181
	310	C90038
		Q90080
	337	O90298
	402	P90143

MANUFACTURER	TYPE	REPORT NUMBER
COMMANDER SNOW	S2	C90112
DE HAVILLAND	DHC-2	C90073
		C90226
		P00040
		P90168
		P90252
		P90267
		Q00067
		Q90270
		W90206
		W90171
ERCO	415E	P90093
FAIRCHILD	FH1100	O90463
FLEET	80	O90293
GOGUILLOT	SE5A	C90144
GRUMMAN	164	Q90175
		Q90245
	AA5A	O90480
	12E	P90083
HILLER		P90180
		P90303
	369	O90608
HUGHES		W90194
	LAH-200	C90107
LAKE	L-13	O90256
LET-BLANIC	M5-210C	P00051
MAULE		W90161
	M20B	W00003
MOONEY	J3	C00023
PIPER		C90104
		C90178
		C90216
		O90118
		Q00007
	PA-11	C90176
	PA-12	O90035
		O90511
		Q90092
		Q90208
	PA-18	C90175
		O90395
	PA-22	C90082
		C90125
		Q90203
	PA-23	O90214
		P00034
		Q90183
		W90111
	PA-24	O90128
		O90404
	PA-25	Q90115

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PIPER (cont'd)	PA-28	A90067
		A90182
		C90122
		O00102
		O90440
		P00085
		P90127
		W90037
	PA-31	Q90236
		W00056
		W90018
	PA-32	A90058
		A90158
	PA-34	C90009
		P90088
		W90013
	PA-38	W00061
	PA-44	O00099
QUICKY	Q2	W90216
RV-3		P90102
SCHWEIZER	SGS233A	C90075
		O90431
SIKORSKY	S 58	P90125
STINSON	108	C00038
		O90192
T-BIRD		P90185
TAYLORCRAFT	BC-12D	C00001
		O90205
TEMCO	SWIFT	O90587
VOLKSPLANE	VP-1	A90277
ZENITH	CH-100	O90219

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	89-04-20	W90078
	89-05-29	W90103
	89-06-15	W90117
	89-06-24	W90130
	89-06-30	W90137
	89-07-03	W90141
	89-07-09	W90144
	89-07-21	W90161
	89-07-26	W90171
	89-07-30	W90177
	89-09-03	W90216
	89-10-09	W90243
	89-12-14	W90285
	90-02-07	W00040
	90-02-26	W00056
	90-03-06	W00061
	90-03-24	W00072
British Columbia	89-01-14	P90015
	89-01-31	P90022
	89-02-08	P90035
	89-02-28	P90102
	89-04-08	P90083
	89-04-14	P90088
	89-04-18	P90093
	89-04-24	P90095
	89-05-13	P90109
	89-05-21	P90125
	89-05-30	P90127
	89-06-03	P90136
	89-06-06	P90142
	89-06-07	P90143
	89-07-05	P90168
	89-07-15	P90180
	89-07-23	P90185
	89-07-28	P90192
	89-08-21	P90228
	89-08-29	P90233
	89-09-10	P90248
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	89-09-12	P90251
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	90-03-27	P00100
Manitoba	89-03-07	C90046
	89-04-08	C90068
	89-05-01	C90075
	89-06-09	C90096
	89-06-17	C90107
	89-07-21	C90144
	89-08-26	C90178
	89-09-12	C90188
	89-12-04	C90225
	90-02-08	C00023
	90-03-11	C00038
Newfoundland and Labrador	89-01-24	A90019
	89-03-18	A90067
	89-06-05	A90125
	89-07-04	A90158
NorthWest Territories	89-03-07	W90051
	89-04-03	W90071
	89-08-11	W90194
	89-10-25	W90256
	90-01-03	W00003
Nova Scotia	89-01-12	A90012
	89-08-21	A90223
	89-11-03	A90277
	90-03-25	A00073
Ontario	89-01-22	O90035
	89-02-02	A90058
	89-02-05	C90024
	89-02-15	C90038
	89-03-12	O90118
	89-03-15	C90051
	89-03-17	O90128
	89-04-04	C90060
	89-04-15	O90165
	89-04-19	C90071
	89-04-22	O90174
	89-04-22	O90175
	89-04-28	C90073
	89-05-04	O90192
	89-05-09	O90205
	89-05-19	O90214
	89-05-22	O90218
	89-05-22	O90219
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	89-06-21	C90113
	89-06-23	O90293
	89-07-02	O90298
	89-07-03	O90300
	89-07-17	O90332
	89-07-23	O90351
	89-07-23	O90353
	89-08-14	O90395
	89-08-17	O90404
	89-08-23	C90175
	89-08-31	O90431
	89-09-06	O90440
	89-09-15	O90454
	89-09-16	O90457
	89-09-17	C90190
	89-09-21	O90463
	89-10-04	O90480
	89-10-26	O90511
	89-11-09	C90216
	89-11-26	O90561
	89-12-10	O90587
	89-12-15	O90608
	90-01-04	O00008
	90-03-02	O00099
	90-03-04	O00102
	90-03-12	O00109
Prince Edward Island	89-07-22	A90182
Québec	89-02-03	Q90032
	89-03-23	Q90073
	89-03-27	Q90080
	89-04-08	Q90092
	89-04-16	Q90094
	89-05-15	Q90115
	89-06-07	Q90143
	89-06-12	Q90153
	89-06-28	Q90175
	89-07-04	Q90181
	89-07-05	Q90188
	89-07-06	Q90183
	89-07-16	Q90201
	89-07-18	Q90208
	89-07-18	Q90203
	89-07-31	Q90217
	89-08-15	Q90236
	89-08-24	Q90245
	89-09-11	Q90263
	89-09-15	Q90266
	89-09-16	Q90270
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	90-03-07	Q00067
Saskatchewan	89-01-05	C90009
	89-03-21	C90057
	89-04-19	C90122
	89-05-03	C90082
	89-06-09	W90111
	89-06-12	C90099
	89-06-20	C90112
	89-07-03	C90125
	89-07-07	C90144
	89-07-21	W90165
	89-07-22	C90149
	89-08-26	C90176
	89-09-29	C90196
	89-10-15	C90201
	89-12-08	C90226
	90-01-02	C00001
Yukon	89-01-15	W90013
	89-04-26	W90083
	89-06-17	W90121
	89-06-25	W90133
	89-07-14	W90152
	89-08-22	W90206
	89-08-23	W90210
	89-09-17	W90227
	89-10-31	W90264